

**UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES**

ENVIRONMENTAL ASSESSMENT

for the

Management of Vulture Damage in the State of Florida

Prepared by:

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SUMMARY OF PROPOSED ACTION

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) proposes to continue the current black and turkey vulture (*Coragyps atratus* and *Cathartes aura*) damage management program in the State of Florida. Upon request for assistance, WS would provide technical assistance and/or would disperse or remove vultures to alleviate damage to livestock, pets, property, human health and safety, and agricultural resources. Vulture damage management would be conducted on private and public land in Florida when the resource owner (property owner) or manager requests assistance. Black vulture damage in Florida primarily includes predation on livestock, and damage to property and aircraft. Congregations of both black and turkey vultures are associated with health concerns, property damage, and nuisance complaints, primarily in urban/suburban areas. Turkey vultures are identified as causing damage less often than black vultures or mixed flocks and are usually associated with roosts in urban/suburban areas.

Under the proposed action, WS would provide technical assistance which includes: instructional sessions, technical and biological information about vultures, information about harassment and husbandry, loaning of scare equipment, selling or distributing harassment tools to property owners and managers, and information on lethal damage management methods (e.g. migratory bird depredation permits). WS would assist property owners and managers with the migratory bird depredation permit process to obtain permits to legally remove vultures to reinforce harassment programs. WS would conduct direct damage management assistance with nonlethal and lethal methods. Nonlethal methods used by WS would include the use of pyrotechnics, lasers, electronic harassment, tactile repellents, mechanical repellents (e.g., coil wire, porcupine wire), modified electric fencing on buildings, effigies and taxidermy prepared effigies, and habitat alteration. Lethal methods used by WS would include shooting and live capture followed by euthanasia. WS recommends and utilizes an Integrated Wildlife Damage Management (IWDM) approach to manage wildlife conflicts. Where property owners or managers would have already adopted a vulture management plan that encompasses such an integrated approach, the WS action would be to assist with the implementation of the integrated wildlife damage management program. Lethal vulture removal would be conducted by WS in situations where nonlethal damage management methods such as harassment, husbandry, and habitat alteration are not appropriate, are ineffective, or are inadequate to achieve vulture damage management goals when used alone.

ACRONYMS

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
CCC	Cultural Carrying Capacity
CDFG	California Department of Fish and Game
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FEIS	Final Environmental Impact Statement
FFWCC	Florida Fish and Wildlife Conservation Commission
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MIS	Management Information System
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
USGS	United States Geological Survey
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	U.S.D.I, Fish and Wildlife Service
VDM	Vulture Damage Management
WS	Wildlife Services

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Department of Agriculture (USDA) is authorized and directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authorities for the Wildlife Services (WS) program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). WS activities are conducted in cooperation with other federal, state and local agencies; and private organizations and individuals. Federal agencies, including the United States Department of Interior, Fish and Wildlife Service (USFWS), recognize the expertise of WS to address wildlife damage issues related to migratory birds.

Wildlife damage management, or control, is defined as the alleviation of damage or other problems caused by or related to the presence of wildlife. It is an integral component of wildlife management (Leopold 1933, The Wildlife Society 1990, Berryman 1991). The WS program uses an Integrated Wildlife Damage Management (IWDM) approach (sometimes referred to as Integrated Pest Management or IPM) in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1, 1-7 of The *Animal Damage Control (ADC) Programmatic Final Environmental Impact Statement* (FEIS; USDA 1997a). These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. The control of wildlife damage may also require that the offending animal(s) be removed or that localized populations of the offending species be reduced through lethal methods.

Individual actions on the types of sites encompassed by this analysis may be categorically excluded under the APHIS Implementing Regulations for compliance with the National Environmental Policy Act [NEPA; 7 CFR 372.5(c)]. APHIS Implementing Regulations also provide that all technical assistance furnished by WS is categorically excluded [7 CFR 372.5(c); 60 Federal Register 6,000 - 6,003 (1995)]. WS has decided to prepare this EA to assist in planning vulture damage management (VDM) activities and to clearly communicate with the public the analysis of cumulative impacts for a number of issues of concern in relation to alternative means of meeting needs for such management in the State. This analysis covers WS's plans for current and future VDM actions wherever they might be requested within the State of Florida. This analysis relies predominately on existing Federal and State agency publications, information contained in scientific literature, and communications with other wildlife professionals. This EA also cites, the ADC FEIS (USDA 1997a).

WS is a cooperatively funded and service oriented program. Before any operational wildlife damage management is conducted, *Agreements for Control* or *WS Work Plans* must be completed by WS and the land owner/administrator. WS cooperates with private property owners and managers and with appropriate land and wildlife management agencies, as requested, with the goal of effectively and efficiently resolving wildlife damage problems in compliance with all applicable federal, state, and local laws. Wildlife Services' mission is to "provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and to safeguard public health and safety" (USDA 1997b). This is accomplished through:

- close cooperation with other Federal and state agencies;
- training of wildlife damage management professionals;
- development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
- collection, evaluation, and dissemination of management information;
- cooperative wildlife damage management programs;
- informing and educating the public on how to reduce wildlife damage; and
- providing data and a source for limited-use management materials and equipment, including pesticides.

All control activities will be in compliance with relevant laws, regulations, policies, orders, and procedures, including the Endangered Species Act (ESA). Control activities will not negatively impact other protected flora or fauna. Notice of availability (NOA) of this document will be made consistent with the Agency's NEPA procedures

in order to allow interested parties the opportunity to obtain and review this document and comment on the proposed management activities.

1.2 PURPOSE

The purpose of this EA is to analyze the effects of WS activities in Florida to manage damage caused by turkey vultures and black vultures. Resources protected by such activities include property, livestock, pets, human health and safety, and agricultural resources.

1.3 NEED FOR ACTION

Conflicts between humans and wildlife are common in Florida. The WS program in Florida received approximately 1,092 requests for wildlife damage management assistance from the public during federal fiscal years 1993 through 2002 (October 1992 - September 2002). Requests for assistance with vulture damage were the most common request for assistance over the last 10 years (Management Information System (MIS), Annual Tables 1993 - 2002). There were 568 requests for assistance with vulture damage in Florida from federal fiscal year 1993 through 2002 (Table 1-1).

Biological carrying capacity is the land or habitat's limit for supporting healthy populations of wildlife without degradation to the animals' health or their environment over an extended period of time (Decker and Purdy 1988). Wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). These terms are especially important in urban areas because they define the sensitivity of a local community to a specific wildlife species. For any given damage situation, there will be varying thresholds by those directly and indirectly affected by the damage. This threshold of damage is a primary limiting factor in determining the acceptance capacity. While the State of Florida may have a biological carrying capacity to support more than the current number of black vultures (*Coragyps atratus*), the wildlife acceptance capacity is often much lower. The State of Florida may be approaching the biological carrying capacity to support the current number of turkey vultures (*Cathartes aura*) as indicated by a slower rate of growth compared to black vultures (*see* Section 4.1.1). However, the wildlife acceptance capacity for turkey vultures is often much lower than the biological carrying capacity. Once the wildlife acceptance capacity is met or exceeded, people will begin to implement population or damage reduction methods, including lethal management methods, to alleviate property damage and public health or safety threats (Loker et al. 1999).

1.3.1 Summary of Proposed Action

The proposed action is for the WS program to continue the current IWDM program that responds to requests for VDM to protect property, livestock, pets, human health and safety, and agricultural resources in the State of Florida (Table 1-2). An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with black or turkey vultures (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used or recommended by WS would include shooting and live trapping followed by euthanasia. Nonlethal methods used or recommended by WS would include habitat alteration, husbandry practices, wire barriers and deterrents, tactile repellents, effigies, and harassment and scaring devices. In many situations, the implementation of nonlethal methods such as habitat alteration, husbandry practices, harassment, and deterrents would be the responsibility of the requestor to implement. VDM by WS would be allowed in the State, when requested, on private property sites or public facilities where a need has been documented, upon completion of an *Agreement for Control*. All management actions would comply with

Table 1-1. Number of requests for technical assistance for wildlife damage received by Wildlife Services of the United States Department of Agriculture, Animal and Plant Health Inspection Service in Florida from federal fiscal year 1993 through 2003. Only the number of requests for the ten most frequently reported wildlife species are shown.

<u>Species</u>	<u>FY2003</u>	<u>FY2002</u>	<u>FY2001</u>	<u>FY2000</u>	<u>FY1999</u>	<u>FY1998</u>	<u>FY1997</u>	<u>FY1996</u>	<u>FY1995</u>	<u>FY1994</u>	<u>FY1993</u>	<u>TOTAL</u>	<u>RANK</u>
Vultures	112	58	68	64	19	39	69	118	67	54	12	680	1
Ducks	5	26	5	4	0	8	11	23	22	14	3	121	2
Woodpeckers	4	11	3	4	0	2	14	13	28	11	7	97	3
Wading birds(mixed)	9	8	6	5	2	11	14	12	16	6	3	92	4
Raptors	3	5	2	4	2	5	8	7	12	31	1	80	5
Cormorant/Anhinga	4	8	10	9	7	12	8	7	6	5	0	76	6
Geese	9	5	9	6	2	7	6	15	13	0	0	72	7
Sandhill cranes	2	3	3	2	0	0	4	9	26	13	1	63	8
Doves	3	3	0	2	1	3	11	12	17	2	1	55	9
Gulls/Seabirds	0	6	4	5	2	3	11	7	3	4	0	45	10

Table 1-2. Number of vulture damage incidents by resource category reported to the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services program in Florida, 1993 – 2001.

Resource	Damage	Total Number of Incidents			Dollar value reported
		Black vultures	Turkey vultures	Mixed vultures	
equipment and machine	damage and fecal droppings	7	3	10	22,075
general property	damage, fecal droppings, odor	37	1	20	156,000
general property	damage threat	1	0	2	0
homes	damage, nuisance, fecal droppings	90	14	176	379,985
homes	damage threat	5	2	15	0
zoo animals	predation, injury, damage	77	0	4	156,000
zoo animals	disease threat, harassment ^a	21	0	50	0
watercraft	damage, gnawing, fecal droppings	55	1	24	84,050
watercraft	damage threat	0	0	2	0
human health/safety general	fecal droppings, injury/illness, threats, odor	13	1	27	3,000
human health/safety aviation	wildlife strikes, damage threats	4	138	109	0
human health/safety transportation	threat	0	0	1	1,500
buildings (non-residential)	damage, fecal droppings, odor	14	9	29	70,100
utilities	fecal droppings, damage	5	0	4	37,500
livestock, cattle	predation, harassment, damage threats	244	0	121	158,400
livestock, piglets	predation	293	0	20	13,551
livestock, goats	predation, damage threat	0	0	4	400

Table 1-2. Continued.

livestock, chickens	predation	0	0	1	200
livestock, domestic ducks	predation	1	0	0	0
livestock feed	contamination/consumption	1	0	0	150
aircraft	wildlife strikes, damage threat	0	2	8	282,000
landfill	damage threat	0	2	0	0
swimming pool	damage	6	0	3	10,000
landscaping	fecal droppings, damage	1	0	7	4,225
wildlife, birds	predation	5	0	0	0
vehicles	damage	24	0	20	34,300
pets	predation, threat ^b	1	0	1	0
clothing	damage	1	0	0	0
non-human food	feeding	1	0	0	3,000
fish food	damage	1	0	0	500
TOTAL		908	173	658	1,416,936

^a Harassment was an unsuccessful attack with no injury to the prey animal.^b Threat was belief by pet owner that vultures would attempt to attack.

1.3.2 Need for Vulture Damage Management to Protect Property Resources

Vultures damage a variety of property resources. Some of the property resources damaged by vultures include buildings, vehicles, ornamental trees, pets, and loss of use of the property.

1.3.2.1 Damage to Buildings and Property

Property damage from black vultures has included tearing and consuming latex window caulking or rubber gaskets sealing window panes; rubber roof linings; asphalt and cedar roof singles; vinyl seat covers from boats, tractors, and cars; and plastic flowers at cemeteries (Table 1-2, Lowney 1999). Black vultures have also torn pool covers, floats used in pools, hot tub covers, and grill covers, and pulled clothes from clothes lines (Table 1-2). Black vultures also damage vehicles by loafing on the cars and trucks resulting in their claws scratching the paint (Table 1-2). They also tear and strip wiper blades from vehicles parked in parking lots (Table 1-2). Black vultures have picked the eyes and torn the bodies on 3-D archery targets and torn swimming aides used by children. Also, large ornamental trees around homes have been killed, injured, or deformed from large numbers of black and turkey vultures roosting in these trees (Lowney 1999). Accumulation of vulture droppings can cause arcing and power outages at electrical transmission towers that vultures use as roosting and perching sites (Table 1-2, Lowney 1999). Property damage from mixed flocks of black and turkey vultures in Florida was usually reported as breaking or tearing roof shingles and pulling rubber gaskets sealing window panes (Table 1-2, Lowney 1999). However, while both species were reported present when damage occurred, it appeared that black vultures caused most property damage and posed the most threat to pets (Table 1-2, Lowney 1999).

1.3.2.2 Harm to Pets

Lowney (1999) reported that predation on pets, primarily dogs and cats, was not well documented. Pets that were restrained by short leashes near black vulture roosts appeared vulnerable to attack. Also, pets placed in small pens with no building which they could retreat into were vulnerable to black vulture attack. Free-ranging cats were reported to hide in shrubbery when black vultures approached and then froze when cornered or circled, allowing the black vultures to attack with their beaks.

Vultures consume dead animals, some of which were killed by botulism (*Clostridium botulinum*; Kalmbach 1939, Ohishi et al. 1979). The toxicity of botulism varies among mammal and bird species (Kalmbach 1939) and is fatal to man and most animals. Botulism toxins are some of the most deadly neurotoxins known to man and animals, causing death by respiratory paralysis (Ohishi et al. 1979). However, the amount of toxin necessary to cause death is lower than that needed to elicit an antibody response; therefore, death may occur before protection can be established (Ohishi et al. 1979). Vultures are highly resistant to botulism (Kalmbach 1939, Ohishi et al. 1979).

Pets, especially dogs, are vulnerable to dying or requiring veterinary care if they consume vulture vomit. The vomit of vultures may contain the bacteria *C. botulinum* which can be fatal to dogs. Some dogs were reported by veterinarians to have died or become sick from botulism, and some owners reported dogs becoming sick after eating vulture vomit (WS, unpublished data).

The bacteria *Staphylococcus aureus* and *Pseudomonas aeruginosa* are found in the crop and stomach of black vultures (Schlatter et al. 1978). Most bacteria are destroyed in the vulture's stomach, except those that sporulate or are highly resistant. The bacteria *Escherichia coli* (*E. coli*), apparently resistant to the vulture's stomach acid, are found in the cloaca of vultures (Schlatter et al. 1978). *E. coli* would be found in vulture fecal droppings since it occurs in the cloaca. While Schlatter et al. (1978) believe vultures are a possible disseminator of pathogenic agents, they also

believe vultures eliminate some potential infectious sources by consuming dead infected animals. Pets may be exposed to these bacteria by eating vomit or by grooming after passing through a roost.

1.3.3 Damage and Conflicts Associated with Roosts

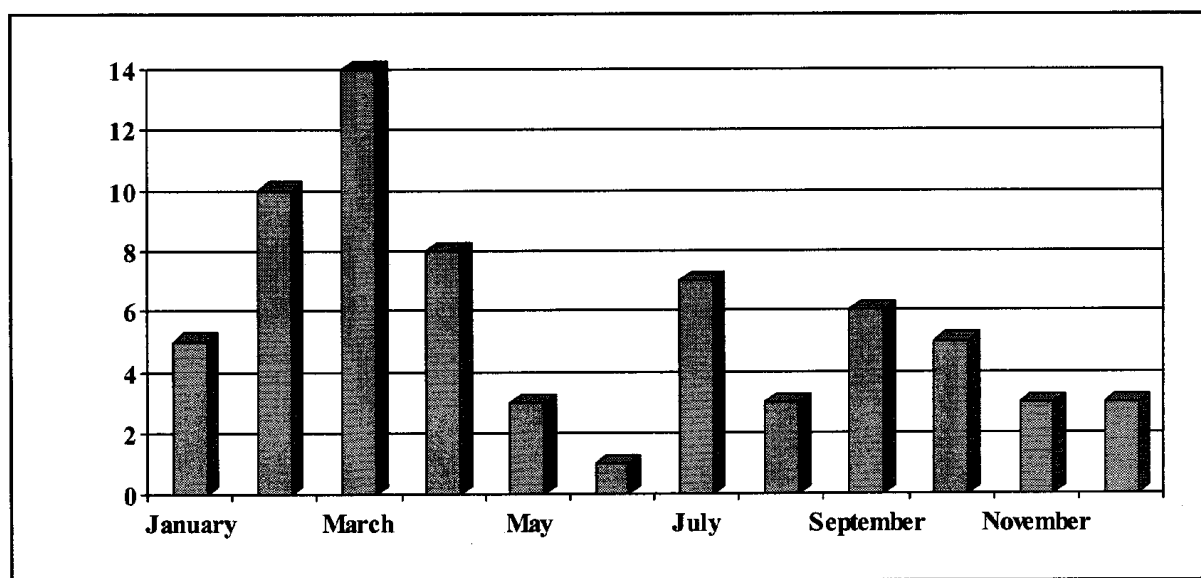
Vulture damage in urban/suburban areas is usually associated with roosts. Damage is often reported as property damage, loss of use, and/or human health concerns. Some landowners have concerns for the health or safety of children or pets. Landowners are concerned about the accumulation of fecal droppings on their property and on natural and ornamental vegetation. Some landowners had concerns about vomit on their properties or homes. A few landowners were concerned about the declining assessed value of their homes due to a roost on the property or in the subdivision. Local governments have reduced the assessed value of property due to vulture roosts (West 1998, Milgrim 2000). Many landowners have concerns about the overpowering ammonia odor which emanates from large vulture roosts due to the accumulation of fecal droppings. Many landowners find the white-wash affect of fecal droppings on their home, lawn furniture, out buildings, and property aesthetically unappealing. Some landowners are upset about the damage to and death of large ornamental trees due to vultures breaking limbs from roosting and the accumulation of acidic fecal droppings on the soil. Some landowners complain about being unable to use their property due to a combination of several types of damage.

1.3.4 Need for Vulture Damage Management to Protect Livestock

1.3.4.1 Predation by Vultures

Black vultures predation on livestock in Florida was reported to WS from 1993 through 2002 (Table 1-2). Lowney (1999) reported a similar pattern of livestock depredation by black vultures in Virginia from 1994 through 1996. Depredation on livestock by black vultures was reported throughout the year. However, it occurred slightly more often February through April in Florida (Figure 1-1).

Figure 1-1. Monthly distribution of depredation reports on livestock by black vultures in Florida, 1993 - 2002.

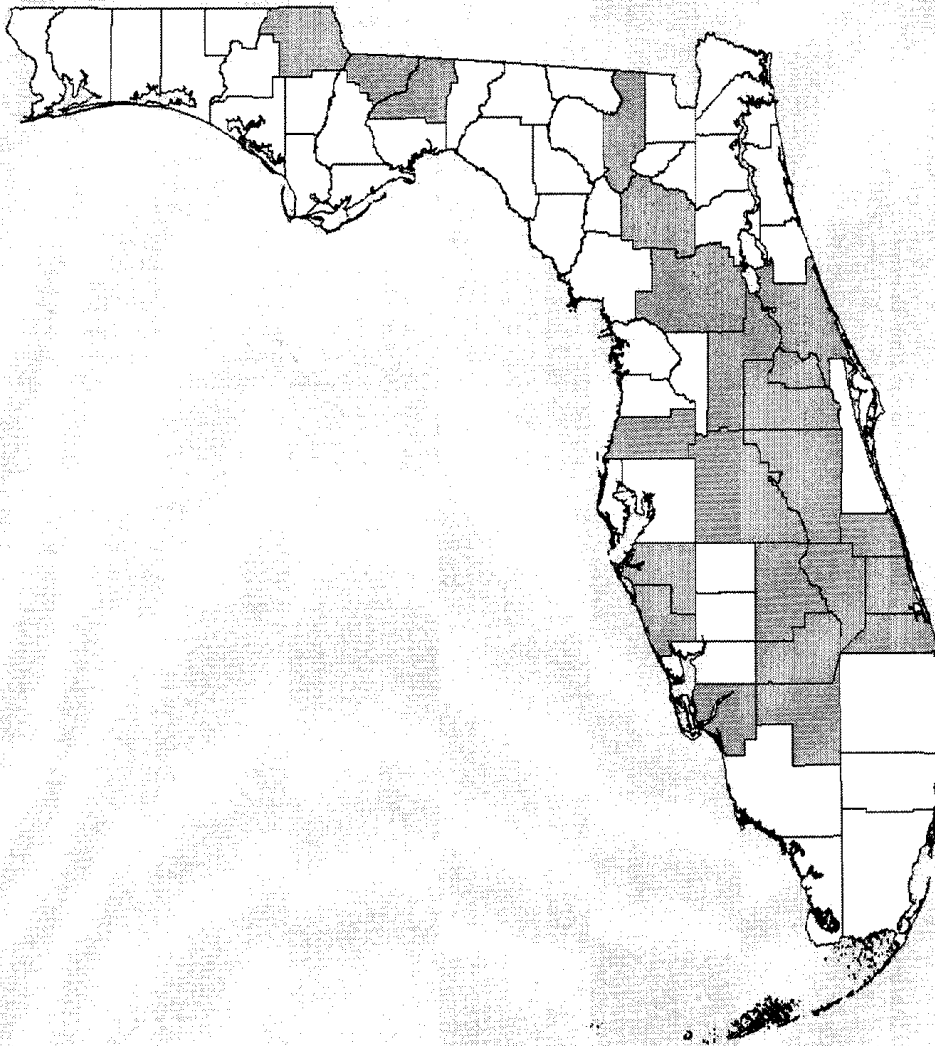


Predation by black vultures on livestock has been reported since the 1930's including domestic

pigs in Kentucky (Lovell 1947, 1952) and Texas (Parmalee 1954), lambs in West Virginia (Roads 1936) and Ohio (Sprunt 1946), and cattle in Texas (Parmalee 1954). Black vulture predation on livestock is distinctive. Lovell (1947, 1952) and Lowney (1999) reported pigs being killed by black vultures plucking their eyes out followed by attacks to the rectum or attacks only to the rectum. Lowney (1999) further observed that black vultures preyed on calves less than 3 weeks old by primarily attacking the eyes, causing blindness, and then entered the abdomen through the rectum, vagina, or penis. Adult cows giving birth were attacked at the eyes, vagina, or rectum. A less frequent point of attack on cattle was the nose and tongue. Black vultures attacked lambs similarly as calves.

Predation by black vultures on livestock was reported in 23 Florida counties from 1993 to 2002 (Figure 1-2). Black vultures preyed on cattle, goats, swine, and domestic fowl, such as chickens and ducks. Black vultures were gregarious and groups averaging 20-60 individuals attacked prey animals (Lowney 1999).

Figure 1-2. Counties (shaded) where vulture depredation on livestock were reported in Florida, 1993 - 2002.



1.3.4.2 Disease Threat to Livestock

Some livestock producers were concerned that vultures may spread disease through fecal droppings or from a farm with infected domestic animals to a farm with healthy animals. Bullock (1956) reported black and turkey vultures spread anthrax among infected and uninfected livestock farms through fecal droppings. While anthrax is rare in the United States, Bullock (1956) demonstrated that anthrax can survive the vulture's digestive system and vultures can spread infectious disease among livestock.

Mechanical transmission is the most probable means of spreading pathogens from vultures to livestock (USDA 2002). Viruses and some bacteria are more likely to be mechanically transmitted to livestock or among farms than other pathogens. It is possible but less likely that pathogens would be transmitted to livestock through vulture fecal droppings because some bacteria die due to changes in temperature, humidity, or pH.

1.3.4.2.1 Disease Threats to Hogs from Vultures

The hog industry is a vertically integrated industry; whereas the cattle industry is less intensely managed and not vertically integrated. The hog industry faces a legitimate disease threat from vultures due to its vertical integration. In hogs, contagious contact is higher due to high density confinement of hogs, the environment around hog houses, and confinement of pigs.

The hog industry is especially concerned about three viruses and two bacterial infections. These diseases can cause devastating economic losses because stopping the disease may require depopulating the farm. The diseases of concern are Porcine Reproductive and Respiratory Syndrome Virus (PRRS), Transmissible Gastroenteritis (TGE), Psuedorabies, Salmonella, and E. coli.

PRRS is a virus that causes pregnant sows to abort or give birth to mummified fetuses (Baysinger and Cooper 1996). PRRS is a disease of regulatory concern. Most states require depopulation of the farm when PRRS occurs. This disease in a herd exposed to a virulent strain can be devastating (Baysinger and Cooper 1996). One hog producer in southeastern Virginia loses approximately 40% of its pregnant sows worth \$7 million dollars annually to PRRS (USDA 2002). And this herd is vaccinated for PRRS. There is a vaccine for PRRS; however, the vaccine is strain specific and a farm can vaccinate its hogs for PRRS only to have a different strain of PRRS infect the herd.

TGE is a highly contagious, high morbidity disease, and it results in high mortality in young pigs (Hogg and Torres 1985). TGE is an intestinal virus resulting in vomiting and diarrhea. The disease is spread by aerosol or contact. Birds can be mechanical carriers of TGE by carrying the virus on their feet or feathers (Hogg and Torres 1985, Gough and Beyer 1982, T. Taylor, Veterinary Services, pers. commun.). Starlings and house sparrows can be as big a risk as vultures in spreading TGE (Gough and Beyer 1982, T. Taylor, Veterinary Services, pers. commun.). A farm must be depopulated to stop the spread of the disease.

Psuedorabies is an acute, highly contagious, frequently fatal virus affecting most domestic animals (Hogg and Beran 1987). It is also a disease of regulatory concern. State law requires immediate depopulation in psuedorabies positive herds. Currently, Florida is free of psuedorabies in domestic hogs. This disease attacks the central nervous system and results in high mortality in young pigs. Other animals (rats) can be infected with psuedorabies and can spread the infection among farms (T. Taylor, Veterinary Services, pers. Commun.).

E. coli and salmonella are diseases of concern to the hog industry (L. Gregory, pers. commun., T. Taylor, Veterinary Services, pers. commun.). Hogs are vaccinated for these bacterial diseases but new strains can defeat the vaccines. Pathogenic strains of E. coli and salmonella have mild to severe response. These bacteria cause diarrhea and are rarely fatal. The bacterial pathogens are less contagious than the viral pathogens.

A pro-active response by the hog industry to the disease threat has been to implement minimal disease procedures. Hogs get minimal contact with people to reduce the risk of transmitting pathogens. These procedures require persons entering buildings containing hogs to shower and dip boots in foot baths. The foot baths sterilize boots with Tektrol. Farm employees are also assigned to work only one farm to prevent disease transmission among farms. Specialists may work multiple hog farms but have uniforms and boots at each farm to prevent transporting pathogens among farms. Vultures break the minimal disease procedures by their activities. Vulture loaf on and around buildings and sometimes enter buildings when doors are left open for maintenance, removing dead hogs, cooling, or accidentally. Vultures also defecate on walkways and leave feathers on walkways. Workers stepping on feces or feathers could mechanically transmit pathogens into the buildings and expose the hogs.

1.3.4.2.2 Disease Threats to Cattle from Vultures

It is possible to transmit pathogens from vultures to cattle but the likelihood is low (T. Taylor, Veterinary Services, pers. Commun.). The cattle industry is less integrated and animals are confined at low densities on pastures. The cattle industry would be concerned about the mechanical transmission of E. coli, salmonella, infectious bovine rhinotracheitis (IBR), and bovine virus diarrhea (BVD). BVD and IBR are viral diseases.

BVD is a reo-like virus that can cause scours and the death rate may be as high as 50% (Hudson and White 1982). BVD also causes abortion, brain damage, and weak calves in cattle (Rice and Rogers 1993). A vaccine is available for BVD.

IBR is the cause of respiratory disease in cattle (Rice and Rogers 1993). The control of IBR can be achieved with vaccines and booster shots (Rice and Rogers 1993).

Salmonella and E. coli occur in cattle. E. coli O157 is a strain of concern. These bacterial pathogens are less contagious than viral pathogens (T. Taylor, Veterinary Services, pers. Commun.).

1.3.5 Need for Vulture Damage Management to Protect Human Health and Safety

Vultures can impact human health or safety through the threat of disease and as potential hazards to aviation. Mixed flocks of turkey and black vultures were generally reported as threats to human health and safety, or as a nuisance (Table 1-2; Lowney 1999). Black and turkey vultures can be a nuisance with their droppings especially when they loaf on roofs of houses, office buildings, and electrical transmission towers. Many people consider vultures a nuisance because of the white-wash effect their droppings leave on trees at roost sites, ammonia odor emanating from roost sites, and a general feeling of doom when vultures congregate around homes.

1.3.5.1 Threat to Aviation from Vultures

Aircraft collisions with birds and other wildlife are a serious economic and safety problem (Cleary et al. 2002, Dolbeer et al. 2000). They also can be a legal liability (Eschenfelder 1999). Eighty percent of bird strikes occur in the airport environment (Cleary et al. 1999). Seventy-one percent of bird strikes occur below 500 feet altitude above ground (Cleary et al. 2000), which is essentially

during takeoff and landing. Wildlife strikes cost the aviation industry over \$465 million dollars annually (Cleary et al. 2002), cost the Air Force \$500 million dollars in damage from 1986 through 1997 (Lovell 1997), and cost the Navy \$217 million dollars in damage from 1986 through 1997 (Lovell 1997). The Air Force has also had 33 fatalities due to aircraft - wildlife strikes (Lovell 1997). Airports have been held liable for wildlife strikes with the courts awarding damages due to negligence (Eschenfelder 1999).

Vultures are the most hazardous bird for aircraft to strike (Dolbeer et al. 2000). Dolbeer et al. (2000) determined the relative hazard of wildlife to aircraft based on the percentage of strikes causing damage (vultures = 67%), effecting flight (vultures 40%), and the number of reports estimating the cost of damage. In Florida, there have been vulture aircraft strikes reported at Key West International Airport, Southwest Florida International Airport, Daytona Beach International Airport, Orlando International Airport, Pompano Beach Airpark, Miami International Airport, Palm Beach International Airport, Ft. Lauderdale/Hollywood International Airport, St. Petersburg/Clearwater International Airport, Orlando Executive Airport, Orlando Sanford International Airport, Vero Beach Municipal Airport, Vandenberg General Aviation Airport, WM P GWINN Airport, Kendall/Tamiami Executive Airport, Naples Municipal Airport, Gainesville Regional Airport, Sarasota/Bradenton International Airport, Deland Municipal Airport, Space Coast Regional Airport, Page Field General Aviation Airport, Opa Locka Airport, Merit Island Airport, St. Lucie County International Airport, Crystal River/Homosassa Airport, Arcadia Municipal Airport, Ormond Beach Airport, and Zephyrhills Municipal Airport (FAA unpublished data).

Vultures are a safety concern for military pilots on low-level, high speed missions. An F-16C struck a turkey vulture on a low-level flight and the bird penetrated the canopy resulting in the pilot ejecting and the plane crashing (Merritt 1989). The likelihood of an aircraft striking a vulture is low, but can result in economic damage or human death (U.S. Air Force, unpublished data, 1999).

Human safety concerns about potential vulture-aircraft strike hazards can be associated with concentrations of vultures attracted by a nearby landfill. Concentrations of vultures can be hazardous to aircraft, especially when sanitary landfills are situated in close proximity (< 5 miles) to flight paths at airports (FAA 1997).

1.3.5.2 Threats to Human Health and Safety

Vultures often form large communal roosts in winter and the buildup of fecal matter may lead to conditions favorable for the development of *Histoplasmosis capsulatum*. Roosts also occur in summer but usually are have fewer vultures than the same roost in the winter. Histoplasmosis is a fungus that grows in the upper 2 inches of soil where bird or bat droppings have accumulated for 3 or more years (Lenhart et al. 1997, Weeks 1984). When dry soil is disturbed, the spores of the fungus become airborne and may enter the lungs of the people disturbing the soil. A histoplasmosis infection would begin in the lungs (Lenhart et al. 1997).

Hypersensitivity pneumonitis is thought to occur as the result of immunologic inflammation after inhalation and sensitization to an organic dust (Saltoun et al. 2000). Hypersensitivity pneumonitis to avian proteins has been reported in individuals working closely with birds in occupational or domestic settings (Saltoun et al. 2000). Hypersensitivity pneumonitis due to community exposure from Canada goose droppings in a suburban environment was reported by Saltoun et al. (2000). Recognition of this disease is important because continued exposure to antigens causing hypersensitivity pneumonitis can lead to pulmonary fibrosis and pulmonary insufficiency (Saltoun et al. 2000). This disease has not been investigated in vulture roosts, but similar conditions that implicate Canada geese in this disease warrant looking at bird roosts involving vultures, crows, blackbirds, and egret rookeries. Especially since some people exposed to strong ammonia odors from vulture roosts report difficulty breathing.

Vulture vomit and fecal droppings may contain pathogens harmful to people (Kalmbach 1939, Ohishi et al. 1979). Many of these pathogens would need to come into direct contact with people to be a health risk. Pathogens found in vulture vomit include botulism (*Clostridium botulinum*). The bacteria *Staphylococcus aureus* and *Pseudomonas aeruginosa* are found in the crop and stomach of black vultures (Schlatter et al. 1978), and may be found in vulture vomit. The bacteria *E. coli*, a bacterium apparently resistant to the vultures' stomach acid, is found in the cloaca of vultures (Schlatter et al. 1978). Since *E. coli* is found in the cloaca of vultures it would be found in fecal droppings. Most people avoid vulture roosts when possible because of the strong ammonia odor, thus the risk to human health is probably low.

1.3.6 Damage and Conflicts with Vultures at Landfills

Black and turkey vultures feed and loaf at landfills in Florida. The presence of vultures at landfills may present a threat to aviation, to agriculture resources (livestock) through disease transmission, and may attract other birds (gulls, crows, starlings) which may lead to other wildlife conflicts with these species.

Vultures can congregate in large numbers at low altitudes at landfills especially in the morning and evening hours. Since 78% of bird strikes are at less than 1,000 feet elevation, 93% of bird strikes occur during take-off or landing, and vultures are the most hazardous bird for aircraft to strike (Cleary et al. 2002, Dolbeer et al. 2000), congregations of vultures near airfields are a hazard. Vultures are a threat to aviation when landfills are within 5 miles of an airfield and the flight path is over or adjacent to the landfill. The threat to aviation from vultures has been described in section 1.3.4.1.

Vultures feed on carrion and meat products at landfills. Vultures also have the ability to transport pathogens mechanically or within their digestive systems (Bullock 1956, Schlatter et al. 1978, T. Taylor, Veterinary Services, pers. commun.). Recently, Virginia had an outbreak of avian influenza in its poultry industry which required the destruction of 4.7 million domestic chickens and turkeys (Trice 2002). The euthanized birds were buried in a landfill and the landfill operator was required to implement an integrated bird control program to prevent the removal of infected poultry by scavengers. While the infected poultry were buried daily, scavengers attempted to feed on carcasses and meat scraps while being dumped from trucks or awaiting burial. Had the vultures exposed themselves to avian influenza infected carcasses, they could have become vectors to other poultry operations because vultures also feed and loaf at farms.

An integrated wildlife damage management program at a landfill may be primarily directed at gulls, but for the program to be effective all bird species that feed at the landfill must be dispersed. Gulls and starlings are species of birds which feed and loaf at landfills in large numbers (thousands or tens of thousands). Crows and vultures also feed and loaf at landfills in large numbers (50 to several hundred). Since birds obtain behavioral cues from each other, vultures can serve as an attractant to other bird species. Vultures may be harassed or lethally removed to reinforce harassment as part of an integrated wildlife damage management program at a landfill.

1.3.7 Summary of Types of Vulture Damage

Lowney (1999) reported the most significant damage by black vultures was predation, injury, and attempted attacks without injury (harassment) to livestock and pets and property damage (e.g., tearing upholstery, scratching paint, or tearing wiper blades from cars, trucks, tractors, and boats; and pecking and tearing roof shingles and latex window caulking and rubber window gaskets with their beaks; Table 1-2). Turkey vultures caused little damage compared to black vultures and mixed flocks (Table 1-2). Turkey vultures were rarely reported killing or injuring livestock or pets, or destroying property (Table 1-2; Lowney 1999). Turkey vultures have been reported pulling at latex or rubber window gaskets at office buildings in Florida (unpub. data). Turkey vultures were infrequently reported as being a nuisance (Table 1-2). Both species can be hazardous to aircraft operations by loafing or soaring on or near airfields, or feeding, loafing, and soaring at landfills near airfields. Both vulture species have the potential to be vectors of animal disease to domestic livestock.

Turkey or black vultures or both species may occupy roost sites in urban or suburban areas where they conflict with people. People tend to have health concerns about these roosts due to excessive accumulations of fecal droppings, and concern for the health of children and pets which may be exposed to bacteria or viruses in vulture fecal droppings or vomit. Damage caused by turkey or black vulture roosts include loss of use of the property, the over-powering ammonia odor emanating from the roost site, death of ornamental trees from acidic fecal droppings or excessive limb breakage, and the aesthetically unappealing white-wash effect from fecal droppings on lawn furniture, the home, walkways, vehicles, and the yard.

1.4 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS has issued a FEIS on the national APHIS/WS program (USDA 1997a). Pertinent information available in the FEIS has been incorporated by reference into this EA. The FEIS may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

1.5 DECISIONS TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS continue a VDM program in Florida?
- If not, how should WS fulfill its legislative responsibilities for managing vulture damage in the Florida?
- Would implementing the proposed WS VDM have any significant impacts requiring preparation of an EIS?

1.6 RELATIONSHIP OF AGENCIES DURING PREPARATION OF THE EA

Based on agency relationships, Memorandums of Understanding (MOU), and legislative authorities, Florida WS is the lead agency for this EA, and therefore responsible for the scope, contents, and decisions made. The USFWS and Florida Fish and Wildlife Conservation Commission (FFWCC) contributed input throughout the EA preparation to ensure an interdisciplinary approach in compliance with NEPA, and agency mandates, policies, and regulations.

1.7 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.7.1 Actions Analyzed

This EA evaluates vulture damage management by WS to protect property, livestock, pets, human health and safety, and agricultural resources on private and public lands or facilities within the State of Florida wherever such management is requested from the Florida WS program.

1.7.2 Period for Which this EA is Valid

This EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be reviewed and revised as necessary. This EA will be reviewed each year to ensure that it is complete and still appropriate to the scope of WS VDM activities.

1.7.3 Site Specificity

This EA analyzes potential effects of WS's VDM activities that will occur or could occur at private and public property sites or facilities within Florida. It also addresses the impacts of VDM in areas where

additional agreements may be signed in the future. Because the proposed action is to reduce damage and because the program's goals and directives are to provide services when requested, within the constraints of available funding and workforce, it is conceivable that additional VDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program.

Planning for the management of vulture damage must be viewed as being conceptually similar to federal or other agency actions whose missions are to stop or prevent adverse consequences from anticipated future events for which the actual sites and locations where they will occur are unknown but could be anywhere in a defined geographic area. Examples of such agencies and programs include fire and police departments, emergency clean-up organizations, insurance companies, etc. Although some of the sites where vulture damage will occur can be predicted, all specific locations or times where such damage will occur in any given year cannot be predicted. The EA emphasizes important issues as they relate to specific areas whenever possible. However, the issues that pertain to the various types of vulture damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard WS Decision Model (Slate et al. 1992) and WS Directive 2.105 is the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by WS in the State (See USDA 1997a - Chapter 2 for a more complete description of the WS Decision Model as well as examples of its application). Decisions made using this thought process will be in accordance with any mitigation measures and standard operating procedures described herein and adopted or established as part of the decision.

The analyses in this EA are intended to apply to any action that may occur *in any locale* and *at any time* within Florida. In this way, APHIS-WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission.

1.7.4 American Indian Tribes and Land

Currently, Florida WS does not have any MOU's with any American Indian Tribes. If WS enters into an agreement with a tribe for VDM, this EA would be reviewed and supplemented if appropriate to insure compliance with NEPA. MOU's, agreements and NEPA compliance would be conducted as appropriate before conducting VDM on tribal lands.

1.7.5 Summary of Public Involvement

As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.8 AUTHORITY AND COMPLIANCE

1.8.1 Authority of Federal and State Agencies in Vulture Damage Management in the State of Florida

See Chapter 1 of USDA (1997a) for a complete discussion of Federal laws pertaining to WS.

1.8.1.1 Wildlife Services Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authorities for the Wildlife Services (WS) program are the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

Since 1931, with the changes in societal values, WS policies and programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. The Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriations accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

1.8.1.2 U.S. Department of Interior, Fish and Wildlife Service Legislative Mandate

The USFWS authority for action is based on the Migratory Bird Treaty Act (MBTA) of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada) and the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture with respect to the MBTA was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

The USFWS is responsible for managing and regulating take of native bird species that are listed as migratory under the MBTA and those that are listed as threatened or endangered under the ESA. Sections 1.8.2.2 and 1.8.2.3 below describe Wildlife Services' interactions with the USFWS under these two laws.

1.8.1.3 Mission of the Florida Fish and Wildlife Conservation Commission

The FFWCC came into existence on July 1, 1999, the creation of a constitutional amendment approved in the 1998 General Election. The FFWCC was formed by combining the Game and Freshwater Fish Commission, the Marine Fisheries Commission, the Florida Marine Patrol, and the Florida Marine Research Institute. Under the direction of the Governor-appointed Commissioners, FFWCC is specifically charged by with the management of the state's fish and wildlife resources, as well as boating safety and navigation. The commissioners are to exercise

the "...regulatory and executive powers of the state with respect to wild animal life and fresh water aquatic life and...with respect to marine life...." The mission of the FFWCC is:

To manage fish and wildlife resources for their long-term well-being and the benefit of people.

1.8.2 Compliance with Other Federal Laws

Several other Federal laws authorize, regulate, or otherwise affect WS wildlife damage management. WS complies with these laws, and consults and cooperates with other agencies as appropriate.

1.8.2.1 National Environmental Policy Act

WS prepares analyses of the environmental impacts of program activities to meet procedural requirements of this law. This EA meets the NEPA requirement for the proposed action in Florida. When WS operational assistance is requested by another Federal agency, NEPA compliance is the responsibility of the other Federal agency. However, WS could agree to complete NEPA documentation at the request of the other Federal agency.

1.8.2.2 Endangered Species Act

It is Federal policy, under the ESA, that all federal agencies shall seek to conserve T&E species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c); Appendices C and D list Federal and State listed T&E species in Florida). WS conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that *"any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available"* (Sec.7(a)(2)). WS obtained a Biological Opinion (B.O.) from USFWS in 1992 describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997a, Appendix F).

Section 9 of the ESA makes it illegal for any person subject to the jurisdiction of the United States to "take" any federally listed T&E species of fish or wildlife without a special exemption. Under the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering.

1.8.2.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any "take" of these species by any entities, except as permitted or authorized by the USFWS.

The USFWS issues permits to requesters for reducing migratory bird damage in certain situations. WS provides on-site assessments for persons experiencing migratory bird damage to obtain information on which to base damage management recommendations. Damage management recommendations could be in the form of technical assistance or operational assistance. In severe cases of migratory bird damage, WS provides recommendations to the USFWS for the issuance of depredation permits to private entities or other agencies. The ultimate responsibility for issuing such permits rests with the USFWS. WS will obtain MBTA permits covering DCCO damage management activities that involve the taking of species for which such permits are required in

accordance with the MBTA and USFWS regulations, or will operate as a named agent on MBTA permits obtained by cooperators.

A recent court case involving mute swans held that the MBTA must provide protection to individual non-native species found within the United States that belong to families of birds already protected under the Act. As a result, many other species in addition to the mute swan became eligible for protection under the MBTA that had previously been excluded. Thus, the Migratory Bird Treaty Reform Act of 2004 was passed to clarify the original intent of the MBTA, the conservation and protection of migratory birds native to North America, and directed USFWS to establish a list of non-native bird species found in the United States. Species on this list, including mute swans, will not be afforded MBTA protection. Certain bird species in North America are not protected under the MBTA because neither the species nor their family was listed in the MBTA. All actions conducted in this EA will be in compliance with the regulations of the MBTA, as amended.

1.8.2.4 The Native American Graves and Repatriation Act of 1990.

The Native American Graves Protection and Repatriation Act require Federal agencies to notify the Secretary of the Department that manages the Federal lands upon the discovery of Native American cultural items on Federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

In consideration of American Indian cultural and archeological interests, the Florida WS program provided a Notice of Availability (NOA) of this EA to all the tribes in Florida. A copy of this EA will be provided to any American Indian tribe in the State of Florida that expresses a concern or interest in the proposed WS action and/or prior to any WS activity proposed to be conducted on tribal lands

1.8.2.5 National Historic Preservation Act (NHPA) of 1966 as amended.

The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that have the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the VDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing birds. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the

historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

1.8.2.6 Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," promotes the fair treatment of people of all races, income levels, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. It is a priority within APHIS and WS. Executive Order 12898 requires Federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898. WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

1.8.3 Compliance with Other State Laws

1.8.3.1 Taking Destructive Birds and Mammals

This regulation of the Florida Administrative Code (FAC; Ch. 68A-12.009) states "*(b) Other migratory non-game birds, except [T&E species], committing or about to commit depredations upon ornamental trees, agricultural crops, livestock or wildlife, or when concentrated in a manner as to constitute a health hazard or public nuisance may be killed under authority of a special permit issued by the U.S. Fish and Wildlife Service if such permit is required.*"

1.9 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and four (4) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers of this EA. Appendix A contains the literature cited used during the preparation of the EA. Appendix B contains a description of the methods used or recommended to reduce damage caused by vultures. Appendix C is a list of the Federally listed T&E species in Florida. Appendix D is a list of the State listed T&E species in Florida.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues that were used to develop mitigation measures and/or SOPs, and issues that will not be considered in detail, with rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional descriptions of affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4.

2.1 AFFECTED ENVIRONMENT

The proposed action may be conducted on properties held in private, local, state or federal ownership in Florida. The areas of the proposed action could include areas in and around commercial, industrial, public, and private buildings, facilities and properties and at other sites where birds may roost, loaf, feed, nest or otherwise occur. Examples of areas where vulture damage management activities could be conducted are, but are not necessarily limited to: agricultural fields, vineyards, orchards, farmyards, dairies, ranches, livestock operations, waste handling facilities, bridges, industrial sites, natural areas, government properties and facilities, private homes and properties, corporate properties, schools, hospitals, cemeteries, parks and recreation areas (including sports fields, playgrounds, swimming pools, etc.), swimming lakes, communally-owned homeowner/property owner association properties, natural areas, wildlife refuges, wildlife management areas, coastal and tidal beaches, ponds, rivers, and inlets, airports and surrounding areas. The control areas may also include property adjacent to identified sites where vultures are causing damage or conflicts. Vulture damage control may be conducted when requested by a landowner or manager, and only on properties with a Cooperative Agreement with WS.

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on Target (Black and Turkey Vulture) Species Populations
- Effects on Non-target Wildlife Species Populations, including T&E Species
- Effects on Human Health and Safety
- Effects on Aesthetics
- Humaneness and Animal Welfare Concerns of Methods Used by WS

2.2.1 Effects on Target (Black and Turkey Vulture) Species Populations

A common concern among members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA are the turkey vulture and the black vulture of which no more than 750 turkey vultures and 750 black vultures are likely to be killed by WS in any one year.

Impacts of West Nile virus on bird populations

West Nile (WN) virus has emerged in recent years in temperate regions of North America, with the first appearance of the virus in North America occurring in New York City in 1999 (MMWR 2002, Rappole et al. 2000). Since 1999 the virus has spread across the United States and was reported to occur in 47 states, Puerto Rico and the District of Columbia in 2004 (MMWR 2005). West Nile virus is typically transmitted between birds and mosquitoes. Mammals can become infected if bitten by an infected mosquito, but individuals in most species of mammals do not become ill from the virus. The most serious manifestation of the WN virus is fatal encephalitis in humans, horses, and birds. West Nile virus has been detected in dead bird species of at least 284 species, including black vultures and turkey vultures (CDC 2005). Although birds infected with WN virus can die or become ill, most infected birds do survive and may subsequently develop immunity to the virus (CDC 2003, Cornell University 2003). In some bird species,

particularly Corvids (crows, blue jays, ravens, magpies), the virus causes disease (often fatal) in a large percentage of infected birds (Audubon 2003, CDC 2003, Cornell University 2003, MMWR 2002). In 2002, WN virus surveillance/monitoring programs revealed that Corvids accounted for 90% of the dead birds reported with crows representing the highest rate of infection (MMWR 2002). Large birds that live and die near humans (i.e. crows) have a greater likelihood of being discovered, therefore the reporting rates tend to be higher for these bird species and are a "good indicator" species for the presence of WV virus in a specific area (Cornell University 2003, Audubon 2003). According to US Geological Survey (USGS), National Wildlife Health Center (2003), information is not currently available to know whether or not WN virus is having an impact on bird populations in North America. USGS states that it is not unusual for a new disease to cause high rates of infection or death because birds do not have the natural immunity to the infection. Furthermore, it is not known how long it will take for specific bird population to develop sufficient immunity to the virus. Surveys of wild birds completed in the last three years have shown that some birds have already acquired antibodies to the virus (USGS-WHC 2003). Based upon available Christmas Bird Counts and Breeding Bird Surveys, USGS-WHC (2003) states that there have been declines in observations of some local bird populations, however they do not know if the decline can be attributed to WN virus or to some other cause. A review of available crow population data by Audubon (2003) reveals that at least some local crow populations are suffering high WN virus related mortality, but crow numbers do not appear to be declining drastically across broad geographic areas. USGS does not anticipate that the commonly seen species, such as crows and blue jays, will be adversely affected by the virus to the point that these bird species will disappear from the U.S. (USGS-WHC 2003).

2.2.2 Effects on Non-target Wildlife Species Populations, Including T&E Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the impact of damage control methods and activities on non-target species, particularly T&E species. WS SOPs include measures intended to mitigate or reduce the effects on non-target species populations and are presented in Chapter 3.

Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with USFWS under Section 7 of the ESA concerning potential impacts of VDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997a, Appendix F). WS is also in the process of reinitiating Section 7 consultation at the program level to assure that potential effects on T&E species have been adequately addressed.

2.2.3 Effects on Human Health and Safety

2.2.3.1 Impacts on Human Safety of VDM Methods

Some people may be concerned that WS use of firearms, pyrotechnic bird scaring devices, traps, and lasers could cause injuries to people. WS personnel occasionally use rifles and shotguns to remove vultures that are causing damage. There is some potential fire hazard to property from pyrotechnic use. There is also the potential of a safety hazard to automobile drivers that may be distracted by harassment efforts, resulting in an accident. Some members of the public may be concerned about the use of foothold traps catching people. There is little potential of human exposure to foothold traps because they are set on the roofs of buildings. There is minimal potential for flash blindness, afterimage, and glare to people due to the laser.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic

violence.

Some members of the public may be concerned about the safety of shooting vultures with shotguns in urban/suburban locations. Their concern would be about people being struck and injured by falling shot. To minimize potential exposure to falling shot, WS employees would shoot vultures loafing on tree limbs by approaching the vultures within 40 yards and shoot up at vultures one at a time. This approach ensures most of the shot is absorbed into the vulture and the tree. Furthermore, non-toxic bird shot used to shoot vultures loses its velocity quickly and therefore loses its energy to cause harm (Table 2-1). The small bird shot that would be used by WS would fall with a force similar to rain and therefore it is highly unlikely to cause any harm to anyone (O'Connor 1978).

Foothold traps are set on rooftops of buildings thus it is highly unlikely the general public would be exposed to these traps. Also, the building owner or manager would be informed about the traps and signs would be posted by WS warning people that traps are set in the area.

Lasers do present some human safety concerns (Glahn et al. 2000). Lasers can cause temporary flash blindness, afterimage, and glare in people (Glahn and Blackwell, undated) and therefore, it is recommended that lasers not be pointed at people (Glahn et al. 2000). Both the Desman and Dissuader laser devices, which would be used by WS to disperse vultures, are classified as Class-IIIB lasers (OSHA 1991). Lasers in lower ranges of Class-IIIB do not produce hazardous diffuse reflection unless someone intentionally stares at the laser close to the diffuser (Glahn and Blackwell undated). The Avian Dissuader laser has an integral key-lock, trigger "safety", a mechanical safety in the form of a trigger safety pin located on the side of the unit, an audible/visual laser "on" indicator, and a 3-second emission delay for maximum safety.

Table 2-1. Velocity (feet per second) of lead and steel shot over distances. Data provided by Federal Cartridge Corporation and Winchester Ammunition. Range is for shotgun fired at 45° angle into air and is measured in yards.

<u>Shot</u>	<u>Pellet Diameter (inches)</u>	<u>Number of pellets/oz</u>	<u>Range (yards)</u>					<u>Maximum range of shot before falling</u>
			<u>0</u>	<u>50</u>	<u>100</u>	<u>200</u>	<u>300</u>	
2 lead	.15	90	1280	687	399	134	83	312
4 lead	.13	135	1400	672	362	105	-	284
6 lead	.11	225	1400	633	299	75	-	250
1 steel	.16	103	1450	672	347	92	-	271
2 steel	.15	125	1450	644	320	80	-	258
4 steel	.13	191	1450	590	264	64	-	231

2.2.3.2 Impacts on Human Safety of not Conducting VDM to Reduce Disease Outbreaks and Bird Strike Hazards at Airports

The concern stated here is that the absence of adequate VDM would result in adverse effects on human health and safety, because the transmission of bird-borne diseases and bird strikes on aircraft would not be curtailed or reduced to the minimum levels possible and practical. Although WS does not receive many requests to conduct VDM for disease outbreaks. WS receives some requests to reduce hazards at airports. The potential impacts of not conducting such work could lead to increased incidence of bird-borne diseases in humans, or injuries or loss of human lives

from bird strikes to aircraft.

2.2.4 Effects on Aesthetics

2.2.4.1 Effects on Human Affectionate-bonds with Individual Birds and on Aesthetic Values of Wild Bird Species

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Some individual members or groups of wild bird species habituate and learn to live in close proximity to humans. Some people in these situations feed such birds and/or otherwise develop emotional attitudes toward such animals that result in aesthetic enjoyment. In addition, some people consider individual wild birds as "pets," or exhibit affection toward these animals. Examples would be people who visit a city park to feed waterfowl or pigeons and homeowners who have bird feeders or bird houses. Many people do not develop emotional bonds with individual wild animals, but experience aesthetic enjoyment from observing them.

Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people. Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Public reaction to damage management actions is variable because individual members of the public can have widely different attitudes toward wildlife. Some individuals who are negatively affected by wildlife often support removal or relocation of damaging wildlife. Other individuals affected by the same wildlife may oppose removal or relocation. Individuals unaffected by wildlife damage may be supportive, neutral, or opposed to wildlife removal depending on their individual personal views and attitudes.

The public's ability to view wild birds in a particular area would be more limited if the birds are dispersed, removed, or relocated. However, immigration of birds from other areas could possibly replace the animals dispersed, removed, or relocated during a damage management action. In addition, the opportunity to view or feed other birds would be available if an individual makes the effort to visit other areas away from the area where damage abatement methods are being implemented. Even where damage abatement methods are being implemented, vultures frequently are available for viewing, albeit in lower abundance.

Some people do not believe that individual birds or nuisance bird roosts should even be harassed to stop or reduce damage problems. Some of them are concerned that their ability to view birds and other wildlife species are lessened by WS nonlethal harassment efforts.

2.2.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Property owners that have vultures roosting in trees or loafing on buildings on their property or on nearby adjacent properties are generally concerned about the negative aesthetic appearance of bird droppings and negative symbolism of vultures associated with death. Property owners may be concerned about declining market value of their homes and future resale value. Business owners generally are particularly concerned because negative aesthetics can result in lost business. Costs associated with property damage include labor and disinfectants to clean and sanitize fecal droppings; implementation of nonlethal wildlife management methods; loss of property use; loss of aesthetic value of homes, businesses, and property where vultures are roosting or loafing; loss of customers or visitors irritated by the odor of or of having to walk on fecal droppings; and loss of time contacting local health departments and wildlife management agencies on health and safety issues.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used by WS.

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife, is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "*... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

Suffering is described as a "*... highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "*... can occur without pain ...*," and "*... pain can occur without suffering ...*" (American Veterinary Medical Association (AVMA) 1987). Because suffering carries with it the implication of a time frame, a case could be made for "*... little or no suffering where death comes immediately ...*" (California Department of Fish and Game (CDFG) 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*... probably be causes for pain in other animals ...*" (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991).

Pain and suffering, as it relates to WS damage management methods, has both a professional and lay point of arbitration. Wildlife managers and the public would be better served to recognize the complexity of defining suffering, since "*... neither medical or veterinary curricula explicitly address suffering or its relief*" (CDFG 1991).

Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some VDM methods are used in situations where nonlethal damage management methods are not practical or effective.

Florida WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/SOPs used to maximize humaneness are listed in Chapter 3.

2.3 ISSUES CONSIDERED BUT NOT IN DETAIL WITH RATIONALE

2.3.1 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area.

Some individuals might question whether preparing an EA for an area as large as Florida would meet the NEPA requirements for site specificity. Wildlife damage management falls within the category of federal or other agency actions in which the exact timing or location of individual activities cannot usually be predicted well enough ahead of time to accurately describe such locations or times in an EA or EIS. The WS program is analogous to other agencies or entities with damage management missions such as fire and police departments, emergency clean-up organizations, insurance companies, etc. Although WS can predict some of the possible locations or *types* of situations and sites where some kinds of wildlife damage will occur, the program cannot predict the specific locations or times at which affected resource owners will determine a bird damage problem has become intolerable to the point that they request assistance from WS. Nor would WS be able to prevent such damage in all areas where it might occur without resorting to destruction of wild animal populations over broad areas at a much more intensive level than would be desired by most people, including WS and state agencies. Such broad-scale population control would also be impractical, if not impossible, to achieve.

If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire State may provide a better analysis than multiple EA's covering smaller zones.

2.3.2 Impacts of Harassment and Removal Methods on Other Migratory Bird Species

Some people are concerned with the impacts of WS's nonlethal and lethal control methods on other migratory bird species. WS abides by laws and regulations of the MBTA regarding the removal and harassment of migratory birds (50 CFR 21). WS minimizes potential impacts to non-target and target migratory bird species with mitigation measures/SOP's listed in Chapter 3. Non-target migratory bird species usually are not affected by WS's control methods, except for the occasional scaring effect from the sound of gunshots or scaring devices. In these cases, non-target migratory birds may temporarily leave the immediate vicinity of shooting/scaring, but would most likely return after conclusion of the action.

CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992); Appendix J ("*Methods of Control*"), Appendix N ("*Examples of WS Decision Model*"), and Appendix P ("*Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program*") of the ADC FEIS (USDA 1997a).

Alternatives analyzed in detail in Chapter 4 are:

- 1) Alternative 1 - Integrated Wildlife Damage Management/Vulture Damage Management Program (Proposed Action/No Action).
- 2) Alternative 2 - Nonlethal VDM Only By WS
- 3) Alternative 3 - Technical Assistance Only.
- 4) Alternative 4 - Lethal VDM Only By WS
- 5) Alternative 5 - No Federal WS VDM.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Integrated Wildlife Damage Management/ Vulture Damage Management Program (Proposed Action/No Action).

The proposed action is for the WS program to continue the current IWDM program that responds to requests for VDM to protect property, livestock, pets, human health and safety, and agricultural resources in the State of Florida. An IWDM approach would be implemented which would allow use of any legal technique or method, used singly or in combination, to meet requestor needs for resolving conflicts with turkey or black vultures (Appendix B). Cooperators requesting assistance would be provided with information regarding the use of effective nonlethal and lethal techniques. Lethal methods used or recommended by WS would include shooting and live trapping followed by euthanasia. Nonlethal methods used or recommended by WS would include habitat alteration, husbandry practices, wire barriers and deterrents, tactile repellents, effigies, and harassment and scaring devices. In many situations, the implementation of nonlethal methods such as habitat alteration, husbandry practices, harassment, and deterrents would be the responsibility of the requestor to implement. VDM by WS would be allowed in the State, when requested, on private property sites or public facilities where a need has been documented, upon completion of an *Agreement for Control*. All management actions would comply with appropriate federal, state, and local laws.

3.1.2 Alternative 2 - Nonlethal VDM Only By WS.

Under this alternative, only nonlethal direct control activities and technical assistance would be provided by WS to resolve vulture damage and conflicts. Persons receiving WS nonlethal assistance could still resort to lethal methods that were available to them. Requests for information regarding lethal management approaches would be referred to FFWCC, FWS, local animal control agencies, or private businesses or organizations. Individuals or agencies might choose to implement WS nonlethal recommendations, implement lethal methods or other methods not recommended by WS, contract for WS nonlethal direct control services, use contractual services of private businesses, use volunteer services of private organizations, or take no action. In some cases, control methods employed by others could be contrary to the intended use or in excess of what is necessary. Appendix B describes a number of nonlethal methods available for use or recommendation by WS under this alternative.

3.1.3 Alternative 3 - Technical Assistance Only.

This alternative would not allow for WS operational VDM in Florida. WS would only provide technical assistance and make recommendations when requested. Producers, property owners, agency personnel, or others could conduct VDM using any lethal or nonlethal method that is legal. Appendix B describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance advice under this alternative.

3.1.4 Alternative 4 - Lethal VDM Only By WS.

Under this alternative, only lethal direct control activities and technical assistance would be provided by WS to resolve vulture damage and conflicts. Persons receiving WS lethal assistance could still resort to nonlethal methods that were available to them. WS technical assistance would include making recommendations to the FWS regarding the issuance of MBTA permits to affected resource/property owners to allow them to lethally remove vultures. Requests for information regarding nonlethal management approaches would be referred to FFWCC, FWS, local animal control agencies, or private businesses or organizations. Individuals or agencies might choose to implement WS lethal recommendations, implement nonlethal methods or other methods not recommended by WS, contract for WS lethal direct control services, use contractual services of private businesses, use volunteer services of private organizations, or take no action. In some cases, control methods employed by others could be contrary to the intended use or in excess of what is necessary. Appendix B describes a number of lethal methods available for use or recommendation by WS under this alternative.

3.1.5 Alternative 5 - No Federal WS VDM.

This alternative would eliminate WS involvement in VDM in Florida. WS would not provide direct control or technical assistance. Requesters of WS services would have to conduct their own VDM without WS input. Requests for information regarding VDM approaches would be referred to FFWCC, FWS, local animal control agencies, or private businesses or organizations. Producers, property owners, agency personnel, or others could conduct VDM using any lethal or nonlethal method that is legal. In some cases, control methods employed by others could be contrary to the intended use or in excess of what is necessary.

3.2 VDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN FLORIDA

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2, 3 and 4 described above. Alternative 5 would terminate both WS technical assistance and operational VDM assistance. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM).

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective¹ manner while minimizing the potentially harmful effects on humans, target and nontarget species, and the environment. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification (i.e., removing roost trees), animal behavior modification (i.e., scaring, tactile repellents), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies That WS Employs Under the Proposed VDM Program -Alternative 1.

3.2.2.1 Technical Assistance Recommendations.

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods. The implementation of damage management actions is the responsibility of the requester. In some cases, WS loans or sells supplies or materials that are of limited availability for non-WS entities to use. Technical assistance may be

¹ The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

provided following a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving vulture damage and conflicts.

3.2.2.2 Migratory Bird Depredation Permit

Migratory bird depredation permits (50 Code of Federal Regulations [CFR] 21.41) may be issued by the FWS to landowners and government agencies to take migratory birds and/or their nests/eggs to protect private and public property and human health or safety. The migratory bird depredation permit process is the responsibility of the FWS. The process involves two federal and one state agency in Florida. Permit applications are available from FWS or WS.

Landowners, land managers, or public officials may contact WS for technical assistance to alleviate damage and conflicts involving migratory birds. Upon request for assistance, WS will consult with the landowner, land manager, or public official about strategies and methods to alleviate migratory bird damage. When determined necessary, WS may recommend lethal methods be used to alleviate the damage. Based upon WS recommendations, the landowner, land manager, or public official may then decide to apply for a FWS depredation permit.

The permit applicant must complete a migratory bird depredation permit application, review 50 CFR, Parts 10, 13, and 21, and pay a processing fee to the FWS. Government agencies are exempt from the processing fee. As part of the process, WS completes a migratory bird damage project report. This report describes the resources harmed, the type damage, migratory bird species and number involved, type of assistance provided, damage abatement methods tried and recommended, other information, and WS recommendation on whether a permit should be issued and the number of birds, nests, or eggs to be taken. The FWS then reviews the permit application and WS report and makes a decision to issue a permit or deny the issuance of the permit. If the FWS decides to issue the permit, the permit is sent to the FFWCC for review. If FFWCC concurs, then FWS issues the permit to the applicant. The permit may be valid for up to one year. Permits are renewable by reapplying annually.

Lowney (1999) reported that lethal methods were recommended in 43% of all livestock depredation incidents from 1994 through 1996. Migratory bird depredation permits have been issued to landowners and managers in Florida to protect property, human health and safety, and livestock. In Florida, WS recommended the issuance of migratory bird depredation permits in 19%, 47% and 7% of incidents involving vulture damage to property and livestock, and threats to human health and safety, respectively, from 1997 through 2001 (MIS, Annual Tables 1997 – 2001).

3.2.2.3 Education

Education is an important element of WS's program activities because wildlife damage management is about finding "balance" or co-existence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of recommendations and information to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the

public are periodically updated on recent developments in damage management technology, laws and regulations, and agency policies.

WS provides informational leaflets about vulture damage management, vulture biology and ecology, and about specific methods (e.g., sources of pyrotechnics). The WS program in Florida provided 995 leaflets to the public about vulture damage management, and sources of pyrotechnics from 1997 - 2001. Additionally, leaflets about managing vulture damage were given to the FFWCC to distribute to the public requesting assistance about vulture damage.

3.2.2.4 Direct Damage Management Assistance.

This is the conducting or supervision of damage management activities by WS personnel. Direct damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when *Agreements for Control* or other comparable instruments provide for WS direct damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, especially if the problem is complex.

3.2.2.5 Research and Development

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management. The Florida WS program monitors NWRC VDM research activities and as appropriate, will adopt and implement newly developed effective VDM methods and strategies as they become available for operational use.

3.2.3 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints that is depicted by the WS Decision Model (Figure 3-1) described by Slate et al. (1992). WS personnel are frequently contacted after requesters have tried or considered nonlethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem, evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a documented process, but a mental problem-solving process common to most if not all professions. Chapter 2 of the ADC FEIS (USDA 1997a) provides a complete description of the WS Decision Model as well as examples of its application.

3.2.4 Decision making by private landowners

The decision maker for private property is the property owner or manager. WS would provide technical assistance and recommendations to this person on methods and strategies to effectively reduce vulture damage and conflicts. Direct control would only be provided by WS if requested, if adequate funding was available, and if the requested direct control activities were in line with WS recommendations.

3.2.5 Decision making by public land managers and local government officials

The decision maker for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals and legal mandates for the property. Locally elected government officials would be the official(s) responsible for deciding appropriate management actions when the town or city is taking responsibility and funding efforts to alleviate vulture damage and conflicts for the town or city. WS would provide technical assistance and recommendations to this person(s) to reduce damage and conflicts. Direct control would only be provided by WS if requested, if adequate funding was available, and if the requested direct control activities were in line with WS recommendations.

Figure 3-1. APHIS, WS Decision Model

3.2.6 Vulture Damage Management Methods Available for Use. (See Appendix B for detailed descriptions of VDM Methodologies)

Livestock producer and property owner practices consist primarily of nonlethal preventive methods such as cultural methods² and habitat modification.

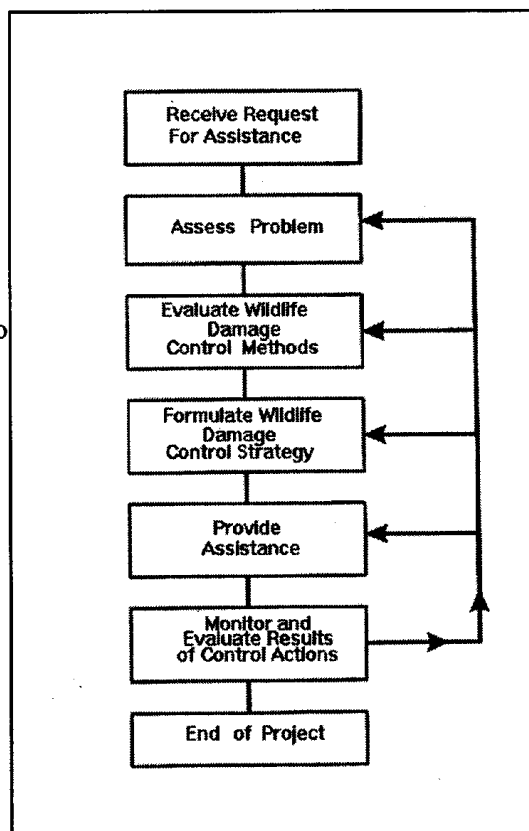
Animal behavior modification refers to tactics that alter the behavior of birds to reduce damages. Some but not all of these tactics include:

- Wire barriers and chemical repellents
- Propane exploders (to scare birds)
- Pyrotechnics (to scare birds)
- Distress calls and sound producing devices (to scare birds)
- Visual repellents and scaring tactics
- Lasers (to scare birds)
- Effigies (to scare birds from roost sites and loafing sites)

Habitat/environmental modification to attract or repel bird species.

Tactile repellents. A number of tactile repellent products are on the market which reportedly deters birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid.

Shooting is the practice of selectively removing target birds by shooting with a shotgun or rifle. Shooting a few individuals from a larger flock can reinforce birds' fear of harassment techniques. Shooting with rifles or shotguns is used to manage vulture damage problems when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. Shooting is an American Veterinary Medical



²Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage..

Association (AVMA) approved method of euthanasia (Beaver et al. 2001) and may be sometimes used to euthanize birds which are captured in live traps.

Live traps are traps designed to capture birds alive for euthanasia. Traps that are available for VDM include but are not limited to baited corral traps, modified padded-jaw foothold traps, and rocket or cannon nets.

Cervical dislocation is an AVMA approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps (Beaver et al. 2001).

Carbon dioxide (CO₂) gas is an American Veterinary Medical Association (AVMA) approved euthanasia method which is sometimes used to euthanize birds which are captured in live traps and when relocation is not a feasible option (Beaver et al. 2000). Live birds are placed in a container or chamber into which CO₂ gas is released. The birds quickly expire after inhaling the gas.

3.2.7 Damage Management Methods to Protect Livestock

There is a range of nonlethal methods available to alleviate black vulture predation on livestock. These nonlethal methods include harassment with 15-mm pyrotechnics, shooting center-fire rifles over vultures loafing in pastures, shooting shotguns in the air, chasing vultures from the pasture with ATV's or vehicles, removing carrion from fields, burning or burying dead livestock, birthing inside buildings, moving expectant cattle to alternate pastures, dispersing nearby vulture roosts with harassment, cutting down trees used for loafing or roosting, and monitoring livestock multiple times per day. These techniques frequently are ineffective (Lowney 1999). Lowney (1999) reported that lethal methods were recommended in 43% of all livestock depredation incidents from 1994 through 1996. WS recommended the issuance of migratory bird depredation permits in 47% of livestock depredation incidents involving black vultures from 1997 through 2001 (MIS, Annual Tables 1997 - 2001). These permits allow livestock producers to legally take vultures to supplement harassment and to protect their livestock from predation.

3.2.8 Examples of WS Operational and Technical Assistance VDM Program

Technical Assistance

Most WS technical assistance requests are received from landowners experiencing property damage from black and turkey vultures. Damage to property can range from vultures tearing off roof shingles, tearing out windshield gaskets on automobiles, to tearing up children's play toys left in the yard. Property damage values range widely. Values can be as small as \$10-\$15 to as much as \$30,000-\$100,000+ depending on type and extent of damage. Other requests for technical assistance come from airports and livestock owners. In most technical assistance requests the property owner/manager is advised to remove attractants, alter roosting habitat, harassment, and often lethal reinforcement. In the majority of the cases there are no real food source attractants to be removed; roosting habitat is often protected by the State and habitat alteration is not allowed; harassment alone does not discourage long-term vulture damage; and shooting often is not implemented by the cooperator. Most technical assistance complaints are not resolved by the landowner implementing WS recommendations. Landowners do not implement the recommendations as prescribed or they are not able to implement the methods required to resolve their issues.

Operational Assistance (Direct Control)

Operational VDM by WS consists of human health and safety issues involving aircraft/wildlife collisions and vehicle/vulture collisions, and personal property damages at or in the vicinity of airports/military installations and landfills.

WS is currently conducting damage management activities on 2 landfills to reduce wildlife and aircraft interactions and 2 other landfills to reduce the number of vultures feeding at the landfill in an effort to alleviate liability issues involving vehicle collisions and property damage. WS also conducts wildlife hazard control at 6 airports/military installations in Florida. Control techniques used at both landfills and

airfields primarily involve non-lethal dispersals using pyrotechnics in conjunction with lethal reinforcement (shooting). Other nonlethal methods such as effigies, auditory and visual frightening devices, habitat management, etc. are used when appropriate. Constant harassment with lethal reinforcement has reduced vulture hazards at both airfields and landfills.

Florida Wildlife Services has worked at the Homestead Air Reserve Base (HARB) providing wildlife hazard management since 1996. Prior to 1996 aircraft from HARB frequently encountered hazardous wildlife including vultures, gulls, and wading birds at the airfield. As a result, numerous aircraft/wildlife strikes occurred. Since 1996, wildlife strikes concerning gulls and wading birds at the airfield have dropped dramatically (1 gull strike in 2002). In 2000, an additional person was added to the HARB wildlife management program. This person (a wildlife technician) was added to manage the growing concern of vultures and gulls at an adjacent landfill (South Dade County Waste Facility). Vulture and gull numbers at the landfill ranged from several hundred to more than 10,000 birds of mixed vulture and gull species depending on the annual migration. As a result of diligent and continued work at the landfill, numbers of vultures can be maintained below 100 birds. Since the wildlife control at the landfill was added to enhance the wildlife management at the airfield, no significant vulture collision has occurred in the Homestead area. Control methods used to control hazards at Homestead ARB and South Dade County Landfill focus on nonlethal techniques (pyrotechnics) with limited shooting. This program has been very successful in reducing the threat of large soaring birds to F16 and F15 pilots at HARB.

Florida Wildlife Services has worked at the Medley Waste Management Facility since 1994 managing vulture and gull hazards to the Miami International Airport. Bird management at this landfill runs during the migration period each year (October – April). Mixed numbers of gulls and vultures at the landfill can exceed the tens of thousands without management, presenting a potentially significant hazard for aviation from Miami International Airport. With the use of 1 person harassing vultures with pyrotechnics and limited shooting, the number of vultures can be maintained below 50 birds. However, if harassment is not persistent, vulture numbers quickly build up. Since Wildlife Services has been involved in bird management at this landfill, no major vulture strikes have occurred as a result of vulture use of the landfill.

3.3 Alternatives Considered But Not Analyzed in Detail With Rationale

3.3.1 Live trap and relocation

Relocation of damaging birds to other areas following live capture generally would not be effective or cost-effective. As a short term solution, vultures have been relocated but returned to the trap site within eight months (Humphrey et al. 2000). Relocation to other areas following live capture would not generally be effective because problem bird species are highly mobile and can easily return to damage sites from long distances (Humphrey et al. 2000), habitats in other areas are generally already occupied, and relocation may result in bird damage problems at the new location. Humphrey et al. (2000) also reported for relocation to be effective, habitat modification and harassment were necessary at the original site. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats (Nielsen 1988).

An example of an unsuccessful attempt by Virginia WS to trap and relocate black and turkey vultures took place in 1997 when WS live trapped and relocated 41 black and 8 turkey vultures. The trapped vultures were patagial wing tagged, loaded into turkey crates, and transported and released near sunset approximately 17 miles west of the capture site on the same day they were captured. Upon release some of the black vultures subsequently moved to other farms and killed livestock. Others moved to nearby towns and became part of a new urban/suburban roost which had to be dispersed with harassment methods. As a result of this relocation effort, WS received letters and phone calls from County Boards of Supervisors and County Administrators opposing relocation of vultures. The counties opposing relocation were in the Shenandoah Valley, Southwestern, New River Valley, and Southside regions of Virginia. The reasons were the counties had an ongoing black vulture livestock predation problem, an urban vulture roost problem, or both problems.

3.4 Mitigation and Standard Operating Procedures for Vulture Damage Management Techniques

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. As appropriate, mitigation measures are incorporated in WS Standard Operating Procedures. The current WS program, nationwide and in Florida, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1997a).

3.4.1 Standard Operating Procedures (SOPs)

Some key SOPs pertinent to the proposed action and alternatives include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their impacts.
- Reasonable and prudent measures or alternatives are identified through consultation with the FWS and are implemented to avoid impacts to T&E species.
- Research is being conducted to improve VDM methods and strategies so as to increase selectivity for target species, to develop effective nonlethal control methods, and to evaluate nontarget hazards and environmental impacts.

3.4.2 Additional Standard Operating Procedures Specific to the Issues

The following is a summary of additional SOPs that are specific to the issues listed in Chapter 2 of this document.

3.4.2.1 Effects on Target Species Populations

- VDM activities are directed to resolving bird damage problems by taking action against individual problem birds, or local populations or groups, not by attempting to eradicate populations in the entire area or region. Generalized population suppression across the State, or even across major portions of the state, would not be conducted.
- WS take is monitored by comparing numbers of birds killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (See Chapter 4).

3.4.2.2 Effects on Nontarget Species Populations Including T&E Species

- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding nontargets.
- Captured non-target animals would be released unless it is determined by the Florida WS personnel that the animal would not survive.
- Observations of birds are made to determine if nontarget or T & E species would be at significant risk from VDM activities. Observations may include but are not restricted to time of dispersals, location of dispersals, dispersal techniques, frequency of dispersals, species in vicinity of dispersals, etc.
- WS has consulted with the FWS regarding potential impacts of control methods on T&E species, and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1997). Further

consultation on species not covered by or included in that consultation process has determined that the vulture damage management program would have *no effect* on threatened or endangered species listed in Florida.

3.4.2.3 Effects on Human Health and Safety

- WS uses VDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P). Where such activities are conducted on private lands or other lands of restricted public access, the risk of hazard to the public is even further reduced.
- WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards.
- WS employees are trained in the safe use of pyrotechnics and lasers.

3.2.2.4 Effects on Aesthetics

- Vultures will be euthanized out of public view to the extent possible.

3.2.2.5 Humaneness and Animal Welfare Concerns of Lethal Methods Used by WS

- Captured vultures would be euthanized by methods recommended by the AVMA (Beaver et al. 2000) or the recommendations of a veterinarian.
- Padded jaw leghold traps would be used if leghold traps were used to capture vultures.
- Adequate water will be provided to vultures captured in decoy traps.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. The chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential impacts would be greater, lesser, or the same. Therefore, the no action alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, floodplains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Impacts: Discussed in relationship to each of the potentially affected species analyzed in this chapter.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Impacts on sites or resources protected under the National Historic Preservation Act: WS VDM actions are not undertakings that could adversely affect historic resources (See Section 1.8.2.4).

4.1 Environmental Consequences for Issues Analyzed in Detail

4.1.1 Effects on Target Species Populations

4.1.1.1 Alternative 1. - IWDM VDM Program (Proposed Action/No Action)

Analysis of this issue is limited to vultures killed during WS VDM. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997a). Magnitude is described in USDA (1997a) as " . . . a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage. WS take is monitored by comparing numbers of animals killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (USDA 1997a).

Breeding Bird Surveys. Bird populations can be monitored by using data from the Breeding Bird Surveys (BBS). The BBS is a large-scale inventory of North American birds coordinated by the U.S. Geological Survey, Patuxent Wildlife Research Center (Sauer et al 2004). The BBS is a combined set of over 3,700 roadside survey routes primarily covering the continental United States and southern Canada. The BBS was started in 1966, and routes are surveyed in June by experienced birders. The stated primary objective of the BBS has been to generate an estimate of population change for all breeding birds. Populations of birds tend to fluctuate, especially locally, as a result of variable annual local habitat and climatic conditions. Trends can be determined using different population equations, and statistically tested to determine if a trend is significant.

Estimates of population trends from BBS data are derived primarily from route-regression analysis (Geissler and Sauer 1990) and are dependent upon a variety of assumptions (Link and Sauer 1998). The statistical significance of a trend for a given species is reflected in the calculated P-value (i.e., the probability of obtaining the observed data or more extreme data given that a hypothesis of no change is true). The level of statistical significance (e.g, 0.01, 0.05, 0.10, etc.)

can vary and is often set by those conducting the analysis. Often BBS or other geographically large survey (e.g., Christmas Bird Count, Breeding Plot Survey) data is not statistically significant at the local level because of relatively smaller sample size (i.e., fewer routes surveyed), more routes with zero observations of a particular bird species which results in larger statistical variance, and low P-values set for statistical significance. The BBS has a statistical level of significance set at $P < 0.01$.

The BBS data is best used to monitor population trends. However, the average number of birds per route (relative abundance) can be used to theoretically estimate the population size (relative abundance/10 mi² x 59,928 mi² (total land/water area in Florida). To use these population estimates the following assumptions would need to be accepted.

- All birds within a quarter mile of the observer are seen at all stops on a BBS route; this assumption is faulty because observers often cannot see a quarter mile in radius at all stops due to obstructions such as hills, trees, and brush and because some bird species can be very elusive. Therefore, the number of birds seen per route would provide a conservative estimate of the population.
- The chosen survey routes are totally random and are fully representative of available habitats. When BBS routes are established, survey rules allow the observers to make stops for surveys based on better quality habitat or convenient parking areas, even though the survey sites are supposed to be spaced a half-mile apart. Therefore, if survey areas had stops with excellent food availability, the count survey could be biased. This would tend to overestimate the population. However, if these sites were not on a route at all, the population could be underestimated.
- Birds are equally distributed throughout the survey area and routes were randomly selected. Routes are randomly picked throughout the state, but are placed on the nearest available road. Therefore, the starting point is picked for accessibility by vehicle. However a variety of habitat types are typically covered since most BBS routes are selected because they are "off the beaten path" to allow observers to hear birds without interruption from vehicular noise.

Christmas Bird Counts. The National Audubon Society (NAS) conducts nationwide bird surveys in December to early January (the NAS Christmas Counts). The Christmas Bird Count (CBC) reflects the number of birds frequenting the state during the winter months. The CBC data does not provide a population estimate, but can be used as an indicator of trends in the population. Researchers have found that population trends reflected in CBC data tend to correlate well with those from censuses taken by more stringent means (National Audubon Society 2004).

Biology and Ecology of Vultures

Two species of vultures are present in Florida: turkey vulture (Cathartes aura) and black vulture (Coragyps atratus). Vultures are in the family Cathartidae and are related to storks and egrets.

Biology

Turkey vultures are large dark brown birds with wing spans up to six feet and weigh about four pounds (NWRC, unpublished data). Distinguishing characteristics of turkey vultures are a bright red head on adults, the leading edge on the underside of the wing is black while the trailing edge is gray, and the long tail extends well beyond the body when in flight (Peterson 1980). Turkey vultures have been reported to live to 16 years of age (Henny 1990). In contrast, black vultures have less than a five foot wing span and average 4.6 pounds in weight [NWRC, unpublished data, 2005 (Peterson 1980)]. Adult and juvenile black vultures have dark grey heads, the body is black, the underside of the wings are dark grey to blackish with white splotches at the end of the wing,

and the tail is relatively short (Peterson 1980) giving the appearance of a large bat when flying. Black vultures have been reported to live to 25 years of age (Henny 1990). The mode of flight between black and turkey vultures differ due to different wing lengths supporting about the same body weight (Rabenhold and Decker 1989). Turkey vultures flap the wings a few times and glide when at low altitudes, whereas black vultures must flap constantly interspersed with brief glides when at low altitudes unless a strong wind blows. At high altitudes both vultures fly by primarily gliding and riding thermal wind currents.

Black and turkey vultures generally lay 2 eggs which are incubated for approximately 40 days (McHargue 1981). The young are fed and cared for by the adults for two to three months before fledgling (Jackson 1983). A post fledgling dependency period where adults lead young to food may exist for vultures (Rabenhold 1987, Jackson 1983). It is believed that vultures nest annually.

Ecology

Turkey and black vultures are obligate scavengers (Rea 1983, Coleman and Fraser 1987). The diet consists of carrion, fish, and invertebrates (Rea 1983, Rabenhold 1987, Coleman and Fraser 1987). However, black vultures will kill other animals and tear the animals apart for food (Roads 1936, McIlhenny 1939, Sprunt 1946, Lovell 1947, 1952, Parmalee 1954, Mrovsovsky 1971, Lowney 1999).

Vultures roost in communal roosts, especially during late fall through early spring since this behavior enhances the ability to find food. Roosts may number as few as 15 birds to over 1,000 (Prather et al. 1976, Lowney and Eggborn, unpublished data, J. Fraser, VPI & SU, pers. commun).

In North America, black vultures occur in the southeastern United States, Texas, Mexico, and parts of Arizona (Wilbur 1983). Black vultures have been expanding their range northward in the eastern United States (Wilbur 1983, Rabenhold and Decker 1989). J. Bucknall (USDA, pers. commun.) reported black vultures living in New Jersey and Pennsylvania in 1995. Black vultures are considered locally resident (Parmalee and Parmalee 1967, Rabenhold and Decker 1989), however some populations will migrate (Eisenmann 1963 cited from Wilbur 1983). Turkey vultures occur in all of Mexico, most of the United States, and in the southern tier of Canada (Wilbur 1983, Rabenhold and Decker 1989). Also, turkey vultures continue to expand their range into the northeastern United States (Wilbur 1983). Northern populations of turkey vultures migrate from summer to more southern wintering areas (Stewart 1977).

Vulture population trends; population estimates

The population status of black and turkey vultures has been in dispute because of debate over sampling procedures. Blem (1995) and Brown (1976) believe black and turkey vultures have been declining in abundance based on CBC. Whereas, Peterjohn and Sauer (1993) report a statistically significant population increase for black vultures and a stable population for turkey vultures during the period 1966 through 1991 from BBS data. Wilbur (1983) cautioned against drawing conclusion regarding the status of vultures until more precise data was collected. Furthermore, Rabenhold and Decker (1989) point out that CBC under-represent black vulture abundance due to mode of flight. Moreover, Sweeney and Fraser (1986) report CBCs as an inappropriate method for surveying vultures. Sweeney and Fraser (1986) report the most appropriate way to survey vulture abundance was counting at the roost.

The BBS and CBC data are the survey instruments used by the USDI, USFWS; US Geological Survey, Division of Biological Survey; and USDA, WS for monitoring vulture and other bird populations. They have been used since the 1980's to detect declines in bird species abundance and since 1994 to estimate population trends (Peterjohn 1994). These survey instruments are appropriate for detecting broad population trends for vultures (Kirk and Mossman 1998, Kiff 2000). For a vast majority of the approximately 650 bird species in North America there is no feasible way to estimate population size because methods have not been developed/tested for the

species in question or the methods are too labor intensive to implement in large-scale surveys (Link and Sauer 1998). Thus government agencies, conservation organizations, and others must rely on existing survey instruments to monitor the status of individual bird species populations.

WS used the best available information to produce reasonable estimates from the BBS and CBC. Any population indices calculated from BBS or CBC survey data would be conservative since both surveys substantially undercount the number of vultures in the environment. Vultures are undercounted due to their behavior and survey methodology. Vultures usually are detected by BBS and CBC observers when vultures are flying. However, Coleman and Fraser (1989) estimated that black and turkey vultures spend 12 – 33% of the day in summer and 9 – 27% of the day in winter flying. Also, the BBS is conducted in the morning and Bunn et al. (1995) reported vulture activity increased from morning to afternoon. These two facets of behavior and methodology of the BBS result in undercounting of vultures.

Breeding Bird Surveys - The BBS is the primary source of information on population change and relative abundance for many North American bird species (Sauer et al. 2004). Survey results are used for a variety of conservation activities including setting harvest regulations for mourning doves (Sauer et al. 1994) and developing management plans for regional conservation initiatives such as Partners in Flight (Carter et al. 2000). Surveys, such as the BBS, form the primary sources of information on population change (Link and Sauer 1998). While flaws in the BBS are well documented (Sauer et al. 2003) it remains one of the best survey instruments available for most bird species, including vultures.

Breeding Bird Survey trend data from 1966-2003 (Sauer et al. 2004) indicate that black vulture populations have increased at an annual rate of 3.0% ($P=0.13$), 3.0% ($P<0.01$), and 2.7% ($P=0.02$) throughout Florida, the United States, and the eastern region, respectively (Figure 4-1). As described above, BBS relative abundance data can be used to theoretically estimate the population size. With a relative abundance of 6.68, a total Florida summer black vulture population could be estimated at approximately 40,000 birds.

Breeding Bird Survey trend data from 1966-2003 (Sauer et al. 2004) indicate that turkey vulture populations have increased at an annual rate of 1.3% ($P<0.01$), and 3.2% ($P<0.01$) throughout the United States, and the eastern region, respectively and have declined at annual rate of -1.4% ($P=0.29$) in Florida (Figure 4-2). As described above, BBS relative abundance data can be used to theoretically estimate the population size. With a relative abundance of 6.94, a total Florida summer turkey vulture population could be estimated at approximately 41,590 birds.

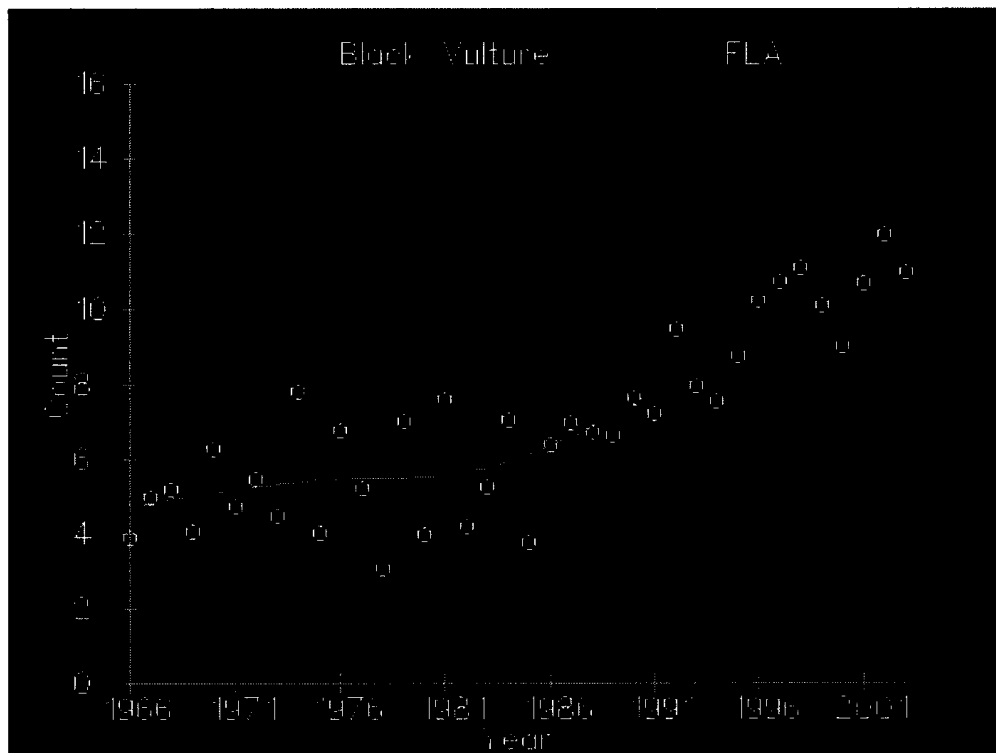


Figure 4-1. Population trend of black vultures in Florida (Sauer et al. 2004).

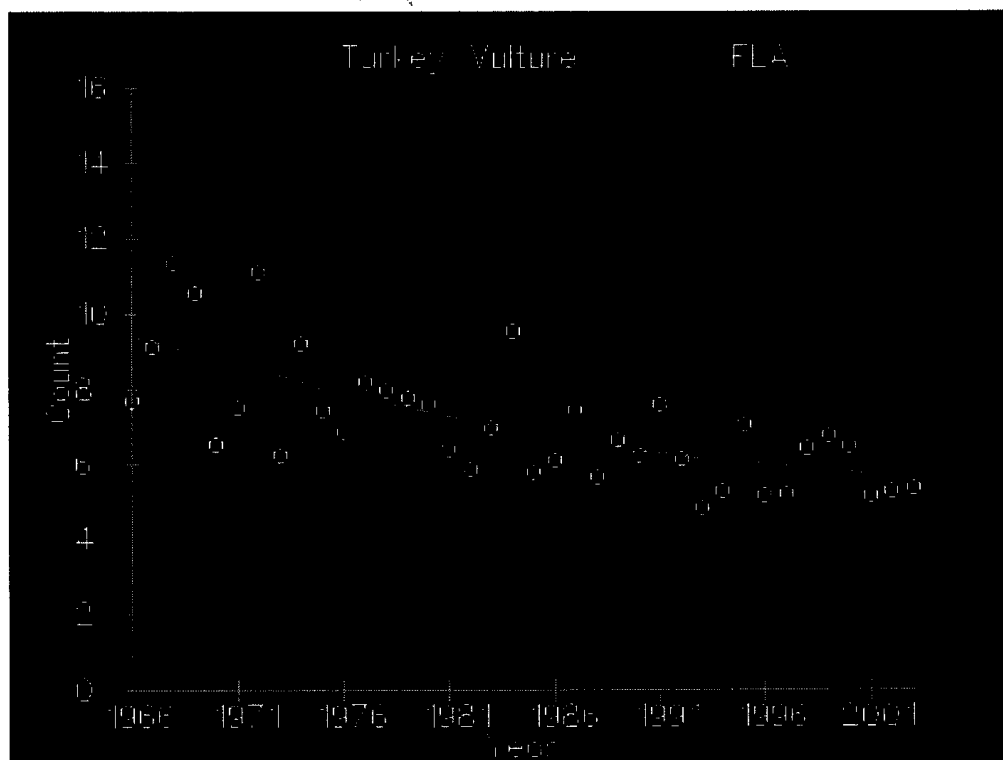


Figure 4-2. Population trend of turkey vultures in Florida (Sauer et al. 2004).

Christmas Bird Counts - The CBC survey is another appropriate survey instrument for detecting broad population trends for vultures (Kirk and Mossman 1998, Kiff 2000). We feel the CBC is appropriate data to use for vulture population analysis because there is no definitive population estimate for vultures and this survey instrument allow us to monitor wintering vulture population trends. While CBC observation sites may change from year to year, it is possible to analyze CBC data from the same observation sites to analyze population trends (M. Avery, NWRC, pers. commun.). Also, the CBC is a 24-hour survey thus it can count vultures throughout the day and it's less affected by time-related variations in vulture activity than surveys that count only during a smaller time frame of the day. This can be important as turkey vultures are more numerous in the afternoon than in the morning (Bunn et al. 1995).

Analyses based on 37 CBC sites in Florida, where counts have been performed annually since 1988, indicate that black vultures display statistically significant increasing population trends annually (25.73%); turkey vulture numbers have not exhibited a detectable trend in Florida (Avery 2004). During the 13-year period 1988-2000, counts of black vultures have increased 3-fold while counts of turkey vultures have more than doubled. The CBC provides an indication of population trends, not an estimate of actual population levels. When used properly, CBC data can reveal important changes in the status of a species' population across a broad area that would otherwise be undetectable. Counts at individual roosts can reveal the status of local populations, but roost counting lacks the consistent, long term, broad geographical coverage of the CBC. Sweeney and Fraser (1986) described the CBC as inappropriate for monitoring vulture populations because they found only weak correlations between roost counts and nearby roadside surveys. This is not a surprising result, however, because after vultures depart a roost, they can disperse over a broad area, and there is no reason to expect a strong correlation between the number of birds departing a roost in early morning and the number counted during a roadside survey conducted hours later. A count at a roost is a point count whereas a survey along a road transect potentially includes birds from multiple roosts over a broad area. Furthermore, there currently is no systematic survey of vulture roosts in Florida or in any other state. Thus, despite possible shortcomings, and imperfections, the CBC data remains the best source of information on statewide vulture population trends.

Christmas Bird Count data (Avery 2004), which shows trends for populations of vultures wintering in Florida, show black vultures and turkey vultures steadily increasing from 1990 through 2004 (Fig. 4-3). The Florida WS VDM focuses predominantly on wintering migratory turkey vultures during the months of November-April. Relatively few turkey vultures are taken during April-October.

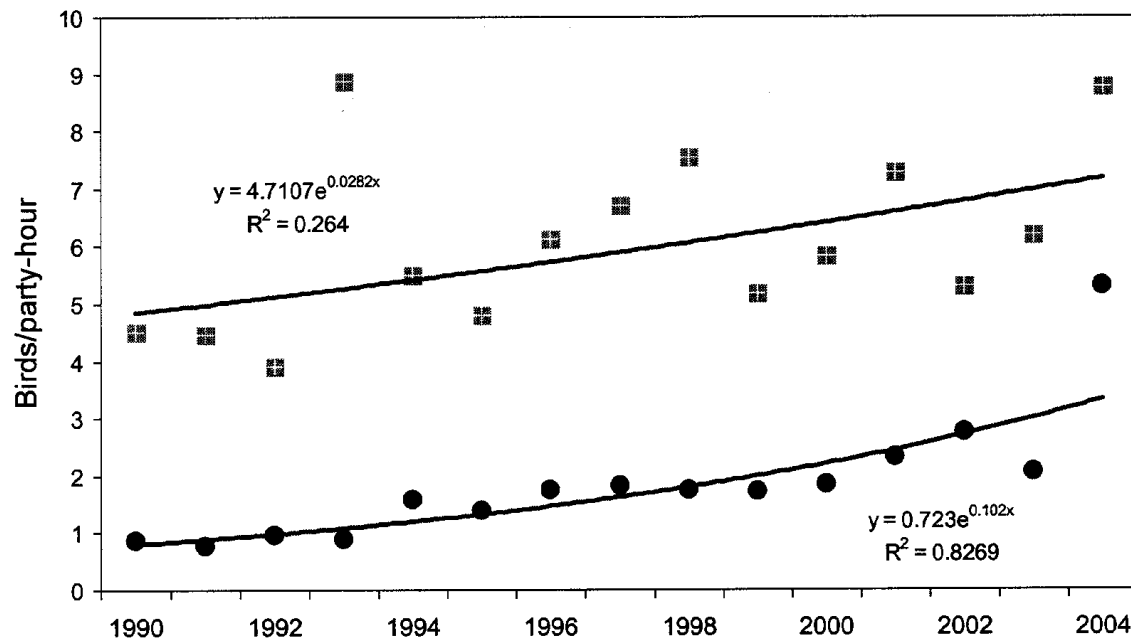


Figure 4-3. Number of black vultures (circles) and turkey vultures (squares) recorded on annual Christmas Bird Counts in Florida, 1990-2004, adjusted for observer effort (Avery 2004).

USFWS issued MBTA depredation permits; vulture damage complaints

USFWS Issued MBTA Depredation Permits - Vultures are protected by the USFWS under the Migratory Bird Treaty Act and take is limited by permit. Therefore, vultures are taken in accordance with applicable state and federal laws and regulations authorizing take of migratory birds and their nest and eggs, including the USFWS and the FFWCC permitting processes. The USFWS, as the agency with management responsibility, could impose restrictions on depredation harvest as needed to assure cumulative take does not adversely affect the continued viability of populations. This should assure that cumulative impacts on vulture populations would have no significant adverse impact on the quality of the human environment. The number of vulture depredation permits issued by the USFWS, and the authorized and reported take from 1999-2003 for the state of Florida is provided in Table 4-1; the number of vultures taken under USFWS issued permits in USFWS Region 5, during calendar years 2000-2002, is provided in Table 4-2; and the number of vultures taken under USFWS issued permits in USFWS Region 4, during calendar years 1999-2003, is provided in Table 4-3.

Many landowners and land managers obtain permits initially and then stop renewing the permits because they believe the permit process is burdensome (Lowney 1999). Thus the number of permits issued annually fails to show the magnitude of the vulture damage problem. Also, many people with vulture damage report they have few neighbors who would report them to law enforcement authorities thus will not apply for a permit.

Table 4-1. Migratory bird depredation permits issued by the United States Department of Interior, Fish and Wildlife Service to alleviate vulture damage in Florida, 1999 - 2003.

<u>Year</u>	<u>Number of permits recommended¹</u>	<u>Number of permits issued</u>	<u>Authorized Take²</u>		<u>Reported Take³</u>	
			<u>Black vultures</u>	<u>Turkey vultures</u>	<u>Black vultures</u>	<u>Turkey vultures</u>
2003	15	74	1279	811	268	457
2002	38	63	3649	3209	295	93
2001*	42	45	594	216	157	324
2000*	26	62	593	232	86	55
1999*	27	38	246	118	145	61
Total	148	282	6361	4586	951	990

1. Recommendations for permits are made by the United States Department of Agriculture, Wildlife Services.

2. Data in 2003 and 1999 is from the United States Department of Interior, Fish and Wildlife Service.

3. The actual take usually is significantly less than the permitted take (Coon et al. 1996, Belant et al. 2000).

* USDA, APHIS, WS did not have numerical take restrictions. Therefore, authorized take for USDA, APHIS, WS is not included in the Authorized Take numbers prior to 2002.

Table 4-2. Black and turkey vulture taken under USFWS issued MBTA permits in USFWS Region 5, during calendar years 2000-2002.

<u>STATE</u>	<u>Number of Vultures Taken by All in FY 2002^{A,B}</u>		<u>Number of Vultures Taken by All in FY 2001^{A,B}</u>		<u>Number of Vultures Taken by All in FY 2000^{A,B}</u>	
	<u>Black</u>	<u>Turkey</u>	<u>Black</u>	<u>Turkey</u>	<u>Black</u>	<u>Turkey</u>
Virginia	423	64	192	135	106	36
Maryland	0	0	17	4	2	0
Delaware	0	0	0	0	0	0
West Virginia	2	4	0	0	0	0
Pennsylvania	0	0	0	2	0	0
New Jersey	0	0	8	9	n/a	n/a
New York	0	0	0	0	0	0
Connecticut	n/a	n/a	n/a	n/a	n/a	n/a
Rhode Island	n/a	n/a	n/a	n/a	n/a	n/a
Massachusetts	n/a	n/a	n/a	n/a	n/a	n/a
Vermont	n/a	n/a	n/a	n/a	n/a	n/a
New Hampshire	n/a	0	n/a	0	n/a	n/a
Maine	n/a	0	n/a	0	n/a	n/a
TOTAL	425	68	217	150	108	36

A. Data is from the U.S. Fish and Wildlife Service, unpublished data, August 2003.

B. n/a means not authorized.

Table 4-3 Black and turkey vulture taken under USFWS issued MBTA permits in USFWS Region 4, during calendar years 1999-2003.

	Number of Vultures Taken by All in 2003		Number of Vultures Taken by All in 2002		Number of Vultures Taken by All in 2001		Number of Vultures Taken by All in 2000		Number of Vultures Taken by All in 1999	
State	Black Vulture	Turkey Vulture	Black Vulture	Turkey Vulture	Black Vulture	Turkey Vulture	Black Vulture	Turkey Vulture	Black Vulture	Turkey Vulture
Alabama	10	5	9	5	15	10	13	2	0	0
Arkansas	0	97	37	0	0	0	0	0	0	0
Florida	268	457	295	93	157	324	86	55	145	61
Georgia	29	32	16	7	0	0	0	0	0	0
Kentucky	27	5	42	39	64	14	27	23	14	6
Louisiana	4	0	2	0	0	0	0	0	0	0
Mississippi	25	1	7	1	1	0	0	0	0	0
North Carolina	31	29	4	0	4	0	21	0	2	0
South Carolina	15	0	21	0	5	5	15	0	7	7
Tennessee	25	4	163	103	5	6	3	1	0	0
TOTAL	434	630	596	248	251	359	165	81	168	74

* Data is from U.S. Fish and Wildlife Service, unpublished data, April 2005.

Vulture damage complaints - Annual tables from the Florida WS program indicate that damage complaints increased from 12 in 1993 to 112 in 2003 (Table 1-1). The number of vulture damage complaints have fluctuated drastically over the 11-year period, the peak was recorded in 1996. Vulture complaints were reported statewide, in 23 counties, from 1993 - 2002, but complaints through the State were unevenly distributed down the central part of the Florida peninsula. The growth in black vulture population from 1980 - 2003 (Sauer et al. 2004), partially explains the increase in reported damage.

WS's methods used to resolve vulture conflicts in Florida have been for the most part nonlethal. For example, for the 11-year period from FY 1993 through 2003, WS personnel killed a total of 1,251 vultures while the number dispersed by use of harassment with pyrotechnics totaled an estimated 250,882 birds (Table 4-4 and 4-5). Of the 1,251 vultures killed by WS, more than 85% of these birds were removed for threats to human health and safety.

Table 4-4. The percentage of vultures killed by the USDA, APHIS, WS in Florida as compared to the total number of vultures dispersed by the USDA, APHIS, WS in Florida annually from 2003 to 1993.

YEAR	Total Number Killed	Total Number Dispersed	Total Number Killed and Dispersed	% OF TOTAL KILLED
2003	420	74,223	74,643	0.57%
2002	58	26,832	26,890	0.22%
2001	266	28,727	28,993	0.92%
2000	37	13,422	13,459	0.27%
1999	37	29,687	29,724	0.12%
1998	15	18,355	18,370	0.08%
1997	243	27,658	27,901	0.87%
1996	123	15,293	15,416	0.80%
1995	51	12,960	13,011	0.40%
1994	1	3,725	3,726	0.03%
1993	0	0	0	0.00%

Table 4-5. Black and turkey vultures killed and dispersed by the Florida Wildlife Services program of the United States Department of Agriculture, Animal and Plant Health Inspection Service to alleviate damage (1993-2003).

<u>Year</u>	<u>No. black vultures killed</u>	<u>No. turkey vultures killed</u>	<u>No. black vultures dispersed</u>	<u>No. turkey vultures dispersed</u>	<u>No. mixed vultures dispersed</u>
2003	49	371	4,171	1,278	68,774
2002	17	41	4,947	4,520	17,365
2001	10	256	387	3,600	24,740
2000	2	35	146	1,086	12,190
1999	5	32	792	917	27,978
1998	4	11	116	10,983	7,256
1997	5	238	229	21,349	6,080
1996	23	100	610	12,168	2,515
1995	12	39	475	10,500	1,985
1994	1	0	2,875	0	850
1993	0	0	0	0	0
TOTAL	110	1123	14,748	66,401	169,733

Vulture population impact analysis

From 1993 to 2003, WS lethally removed a total of 1,251 vultures as part of their VDM program in Florida (Table 4-3). Vultures were removed to re-enforce nonlethal VDM methods and to reduce vulture populations in site specific areas only when needed to reduce damage and conflicts, thus only a minimal number of vultures were removed from a given area. Over this 10-year period, the Florida WS program lethally removed less than 0.5% of the total number of vultures dispersed (Table 4-4). Based upon an anticipated increase in requests for WS VDM assistance, WS expects to lethally take no more than 750 turkey vultures and 750 black vultures each year under the proposed action.

Based on vulture biology and ecology, BBS and CBC vulture population trend data, a BBS derived vulture population estimate of approximately 40,000 birds for each of the vulture species in Florida, the limited number of vultures taken under USFWS issued MBTA depredation permits, the increasing trend in the number of vulture damage complaints over the past 10 years, a comparison of the number of birds killed in proportion to the number of birds dispersed (less than .05%), and the limited lethal take of vultures in Florida (no more than 750 turkey vultures and 750 black vultures each year), the proposed VDM program should have minimal effects on the overall national, regional and state black vulture and turkey vulture populations. The Florida Fish and Wildlife Conservation Commission concurs with this determination (M.A. Poole, FFWCC, Letter- November 22, 2005).

4.1.1.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would not kill any vultures because no lethal methods would be used

by WS. Although WS lethal take of target bird species would not occur, it is likely that, without WS conducting some level of lethal VDM activities, resource owners and land managers efforts could increase, stay the same, decrease, or cease leading to potentially similar, lesser or even greater cumulative impacts on target species populations than those of the proposed program alternative. For the same reasons shown in the population impacts analysis under the proposed action alternative, it is unlikely that vulture populations would be adversely impacted by implementation of this alternative.

4.1.1.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would have no direct impact on vulture populations because the WS program would not conduct any operational VDM activities but would be limited to providing advice only. Although WS lethal take of target bird species would not occur, it is likely that, without WS conducting some level of operational VDM activities, resource owners and land managers efforts could increase, stay the same, decrease, or cease leading to potentially similar, lesser or even greater cumulative impacts on target species populations than those of the proposed program alternative. For the same reasons shown in the population impacts analysis under the proposed action alternative, it is unlikely that vulture populations would be adversely impacted by implementation of this alternative.

4.1.1.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, WS would likely have a greater impact on vulture populations than the proposed action alternative since WS would only be able to recommend or implement lethal control methods to resolve vulture damage in all situations. WS would be unable to use or recommend any effective or practical nonlethal methods. It is likely that a greater number of vultures would likely have to be killed to attempt to achieve the same results as the proposed action. For the same reasons shown in the population impacts analysis under the proposed action alternative, it is unlikely that vulture populations would be impacted adversely by implementation of this alternative.

4.1.1.5 Alternative 5 - No Federal WS VDM

Under this alternative, WS would have no impact on vulture populations. Although WS lethal take of target bird species would not occur, it is likely that resource owners and land managers efforts could increase, stay the same, decrease, or cease leading to potentially similar, lesser or even greater cumulative impacts on target species populations than those of the proposed program alternative. For the same reasons shown in the population impacts analysis under the proposed action alternative, it is unlikely that vulture populations would be adversely impacted by implementation of this alternative.

4.1.2 Effects on Nontarget Wildlife Species Populations, including Threatened and Endangered Species.

4.1.2.1 Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Adverse Impacts on Nontarget (non-T&E) Species. Direct impacts on non-target species occur when WS program personnel inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. SOPs to reduce potential impacts to non-target species are listed in Chapter 3.

WS has not killed any non-target species during VDM activities in Florida. Non-target migratory bird species and other non-target wildlife species are usually not affected by WS's VDM methods, except for the occasional scaring from harassment devices. In these cases, migratory birds and other affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. The impacts would be short-term as

animals would return to their normal activities once the harassment program ended for the evening. Harassment programs to disperse vulture roost normally occur during the last 30 - 90 minutes of the day. Potential impacts to roosts, rookeries, and nesting sites of wading birds, snail kites and other bird species of concern will be minimized by prior and continual observations of these species (when present) and their reactions to various dispersal techniques. As appropriate, dispersal techniques will be adjusted or modified to reduce potential adverse impacts.

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-target species. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. Any non-target species captured in a live trap or net would be released unharmed on site. No adverse impacts from the use of repellents are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997a).

While every precaution is taken to safeguard against taking non-target animals, changes in local flight patterns and other unanticipated events can result in the incidental take of unintended species. These occurrences are rare to non-existent in Florida, and should not affect the overall populations of any species under the proposed program. It is possible that crows or other scavenging birds may be accidentally captured in baited panel traps. These non-target birds would be released alive and unharmed. These occurrences are rare, have not occurred in Florida, and should not affect the overall populations of any scavenging bird species under the proposed program.

Beneficial Impacts on Nontarget Species. Locations used as vulture roosts tend to have few other bird species present. In these cases, the relocation of a vulture roost would benefit those migratory birds that are displaced by vultures.

T&E Species Impacts. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. Mitigation measures to avoid T&E impacts are described in Chapter 3. Those measures and characteristics should assure there would be no jeopardy to T&E species from the proposed action.

Federally Listed Species. WS has obtained the list of federal listed T&E species for the state of Florida (see Appendix C) and has determined that the proposed WS VDM would have no effect on any listed bird, mammal, invertebrate, fish, reptile, amphibian, or plant species or critical habitat. This no effect determination is based on an evaluation of WS methods in the U.S. Fish and Wildlife Service's (USFWS) 1992 Biological Opinion (BO) on the Animal Damage Control Program. For the full context of the BO, see Appendix F of the ADC Final EIS (USDA 1997a). The 1992 BO concluded that the bald eagle would not be adversely affected by any aspect of the WS program which included all methods of VDM described herein. In addition, WS has determined that the proposed VDM program will have no effect on new T&E species or critical habitat listed since completion of the 1992 BO and that the use of lasers will have no effect on any T&E species.

State Listed Species. WS has obtained and reviewed the list of Florida State listed T&E species (see Appendix D) and has determined that the proposed WS VDM program will have no effect on any of these species. The Florida Fish and Wildlife Conservation Commission concurs with this determination (M.A. Poole, FFWCC, Letter-November 22, 2005).

4.1.2.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS lethal removal of nontarget animals would be less than that of the proposed action because no lethal management actions would be taken by WS. Impacts from WS use of nonlethal methods (i.e. harassment, repellents, etc) would be similar to the proposed action.

However, resource owners and land managers whose vulture damage and conflicts were not effectively resolved by WS nonlethal control methods and recommendations would likely resort to lethal methods that are available to them. This could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than the proposed action. For example, shooting by persons not proficient at wildlife identification could lead to killing of non-target animals. It is hypothetically possible that frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including T&E species (USDA 1997a, White et al. 1989, USFWS 2001, USFDA 2003). The illegal use of chemicals on vultures has occurred in Florida (Holt 1998). Hazards to raptors, including bald eagles and falcons, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated individuals.

4.1.2.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS impacts on non-target animals would be less than that of the proposed action because no direct management actions would be taken by WS. Technical assistance information would be provided upon request. Although technical support might lead to more selective use of control methods than that which might occur under Alternative 5, resource owners and land managers efforts to reduce or prevent predation could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action. It is hypothetically possible that, similar to Alternative 2 and 5, frustration caused by the inability to reduce damage and associated losses could lead to illegal use of chemical toxicants which could lead to unknown effects on local non-target species populations, including some T&E species (USDA 1997a, White et al. 1989, USFWS 2001, USFDA 2003). The illegal use of chemicals on vultures has occurred in Florida (Holt 1998). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated individuals.

4.1.2.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, impacts from WS use of nonlethal methods (i.e. harassment, repellents, etc) would be less than that of the proposed action because no nonlethal management actions would be taken by WS. Impacts from WS use of lethal methods would be similar to the proposed action. Technical support would likely lead to more selective use of lethal management methods by resource owners and land managers than that which might occur under Alternative 2 and 5. Impacts from resource owners and land managers use of nonlethal methods would be similar to Alternative 5.

4.1.2.5 Alternative 5 - No Federal WS VDM

Alternative 5 would not allow any WS VDM in the State. There would be no impact on non-target or T&E species by WS VDM activities from this alternative. However, resource owners and land managers efforts to reduce or prevent damage and conflicts could increase which could result in less experienced persons implementing control methods and could lead to greater take of non-target wildlife than under the proposed action. For example, shooting by persons not proficient at wildlife identification could lead to killing of non-target animals. It is hypothetically possible that frustration caused by the inability to reduce damage and losses could lead to illegal use of chemical toxicants which could impact local nontarget species populations, including some T&E species (USDA 1997a, White et al. 1989, USFWS 2001, USFDA 2003). Illegal use of chemicals (parathion) on black vultures occurred in Florida in 1997 which resulted in the death of 18

vultures (Holt 1998). Hazards to raptors, including bald eagles, could therefore be greater under this alternative if chemicals that are less selective or that cause secondary poisoning are used by frustrated individuals.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Impacts on human safety of VDM methods

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

VDM methods used by WS that might raise safety concerns include shooting with firearms, traps and harassment with pyrotechnics and lasers. Firearms, traps, pyrotechnics, and lasers are only used by WS personnel who are trained and experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns associated with these methods. The Florida WS program has had no accidents involving the use of firearms, pyrotechnics, lasers, or traps in which any person was harmed or injuries. A formal risk assessment of WS's operational VDM methods (except lasers) found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse impact on human safety from WS's use of these methods is expected.

Upon request, technical advice would be provided to non-WS entities in the safe and proper use of lethal and nonlethal VDM control devices. Hazards to humans could be greater under this alternative if personnel conducting VDM activities are poorly or improperly trained. Since WS would be available to provide advice and information on the safe and proper use of these methods adverse impacts should be less than Alternative 5.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, VDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique and harassment with pyrotechnics and lasers. Risks to human safety from WS's use of firearms, lasers, and pyrotechnics would be similar to those described under Alternative 1.

Upon request, technical advice would be provided to non-WS entities in the safe and proper use of nonlethal control devices. Hazards to humans could be greater under this alternative if personnel conducting VDM activities are poorly or improperly trained. Risks to human safety from use of firearms, lasers, and pyrotechnics would be similar to those described under Alternative 1. Risks from the use of traps would be similar to Alternative 5.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any VDM method. Risks to human safety from WS's use of firearms, traps, lasers and pyrotechnics would be lower than the proposed action alternative, but not significantly because Florida WS's program has an excellent safety record in which no accidents involving the use of these devices have occurred that have resulted in a member of the public being harmed or injured.

Upon request, technical advice would be provided to non-WS entities in the safe and proper use of lethal and nonlethal VDM control devices. Non-WS entities would be able to use firearms, traps, lasers and pyrotechnics in VDM programs and this activity would likely occur to a greater extent in the absence of WS's direct control assistance. Hazards to humans could be greater under this alternative if personnel conducting VDM activities are poorly or improperly trained. Since WS would be available to provide advice and information on the safe and proper use of these methods adverse impacts should be less than Alternative 5.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, VDM methods that might raise safety concerns include shooting with firearms and use of traps. Risks to human safety from WS's use of firearms and traps would be similar to those described under Alternative 1.

Upon request, technical advice would be provided to non-WS entities in the safe and proper use of lethal control devices. Hazards to humans could be greater under this alternative if personnel conducting VDM activities are poorly or improperly trained. Risks to human safety from use of firearms, and traps would be similar to those described under Alternative 1. Risks from the use of pyrotechnics and lasers would be similar to Alternative 5.

Alternative 5 - No Federal WS VDM

Under this alternative, risks to human safety from WS's use of firearms, traps, lasers, and pyrotechnics would be alleviated because no such use would occur. Non-WS entities would be able to use firearms, traps, lasers and pyrotechnics in VDM programs and this activity would likely occur to a greater extent in the absence of WS's assistance. Hazards to humans could be greater under this alternative if personnel conducting VDM activities are poorly or improperly trained.

4.1.3.2 Impacts on human safety by not conducting VDM to reduce disease outbreaks and bird strike hazards at airports

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

As discussed in Chapter 1, vultures can present a bird aircraft strike hazard at airports and carry diseases that are transmittable to humans and that can adversely affect human health. An Integrated VDM strategy, a combination of lethal and nonlethal means, has the greatest potential of successfully reducing this risk. All VDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage or threats to public health or safety for people who would have no relief from such damage or threats if nonlethal methods were ineffective or impractical. An example would be in a situation such as those involving urban vulture populations, the implementation of nonlethal controls such as harassment methods could actually increase the risk of human health and safety problems at other sites by causing the birds to move to other urban roosting sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall human health and safety concerns in the local area. By having the option of using lethal control methods where nonlethal methods would likely not be successful, the risks to human health and safety are reduced not only at the vulture damage site but also in the surrounding area.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would be restricted to implementing and recommending only nonlethal methods in providing assistance with vulture damage problems and conflicts. The success or failure of the use of nonlethal methods can be quite variable. In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to sites not previously affected. In such cases, human health and safety risks may remain the same or actually become worse. Some requesting entities would reject WS assistance for this reason and would likely seek to achieve vulture control by other means. However, if WS is providing direct operational assistance in relocating vultures, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any VDM methods. Only technical advice would be recommended to alleviate vulture damage and conflicts in all situations. Potential impacts would be variable. With WS technical assistance but no direct management, entities requesting VDM for human health and safety concerns would either take no action which means the risk of human health and safety problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement WS recommendations for nonlethal and lethal control methods. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective VDM program.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to sites not previously affected. This potential risk would be less likely under this alternative than Alternative 5 when people requesting assistance receive and accept WS technical assistance recommendations.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, WS would be restricted to implementing and recommending only lethal methods in providing assistance with vulture damage problems and conflicts. Potential impacts would be variable. At times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms. In these situations WS would not be able to recommend or use nonlethal methods that otherwise would be available under the proposed action. When lethal VDM can not be used or recommend by WS at a site-specific location, entities requesting VDM for human health and safety concerns would either take no action which means the risk of human health and safety problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement their own nonlethal VDM program. Individuals or entities that implement nonlethal management actions may or may not have the experience necessary to efficiently and effectively conduct an effective VDM program.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to sites not previously affected. This potential risk under this alternative would be similar to Alternative 5.

Alternative 5 - No Federal WS VDM

Potential impacts would be variable. With no WS assistance, resource owners and land managers would be responsible for developing and implementing their own VDM program. Efforts by these individuals to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a greater potential of not reducing vulture hazards, than under the proposed action.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the birds to move to sites not previously affected. Under this alternative, human health problems could increase if individuals were unable to find and implement effective means of controlling vultures that cause damage problems.

4.1.4 Effects on Aesthetics

4.1.4.1 Effects on Human Affectionate-Bonds with Individual Birds and on Aesthetic

Values of Wild Bird Species

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Some people who routinely view individual birds such as vultures would likely be disturbed by removal of such birds under the proposed program. Other people believe vultures fill an important ecological role eating dead animals and therefore vultures should not be harassed or killed. WS is aware of such concerns and takes this into consideration when planning VDM activities.

Some people have expressed opposition to the killing of any vultures during VDM activities. Under the proposed program, some lethal control of birds would occur and these persons would continue to be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing by persons with that interest.

Some people do not believe that vultures or vulture roosts should be harassed to stop or reduce damage problems. Some people who enjoy viewing vultures may feel their interests are harmed by WS's nonlethal harassment program. Mitigating that impact, however, is the fact that overall numbers of vultures in the area are not diminished by a harassment program and people who enjoy viewing vultures can still do so on State wildlife management areas, National wildlife refuges, National parks, National forests, as well as numerous private property sites where the owners are not experiencing damage and are tolerant of their presence.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would not conduct any lethal VDM but would still use and recommend nonlethal VDM methods, such as harassment of vultures that were causing damage. Some people who oppose lethal control of wildlife by government but are tolerant of government involvement in nonlethal wildlife damage management would favor this alternative.

Persons who have developed affectionate bonds with individual wild birds would not be affected by the death of individual birds under this alternative, but might oppose dispersal or translocation of certain birds. Some people do not believe that vultures or vulture roosts should be harassed to stop or reduce damage problems. Some people who enjoy viewing vultures may feel their interests are harmed by WS's nonlethal harassment program. Mitigating that impact, however, is the fact that overall numbers of vultures in the area are not diminished by a harassment program and people who enjoy viewing vultures can still do so on State wildlife management areas, National wildlife refuges, National parks, National forests, as well as numerous private property sites where the owners are not experiencing damage and are tolerant of their presence.

Although WS would not perform any lethal activities under this alternative, other entities would likely conduct lethal VDM activities in WS absence. The effects would then be similar to the proposed action alternative.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any direct operational VDM but would still provide technical assistance to persons requesting assistance with vulture damage. Some people who oppose direct operational assistance in wildlife damage management by the government but favor government technical assistance would support this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative because the individual birds would not be killed or harassed by WS. However, other

entities would likely conduct similar VDM activities as those that would no longer be conducted by WS. The effects would then be similar to the proposed action alternative.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, only lethal VDM activities would be implemented or recommended by WS. People that have expressed opposition to the killing of any vultures during VDM activities would likely be opposed to this alternative. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular birds that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing by persons with that interest.

Although WS would not perform any nonlethal activities under this alternative, other entities would likely conduct nonlethal VDM activities in WS absence. The effects would then be similar to the proposed action alternative.

Alternative 5 - No Federal WS VDM

Under this alternative, WS would not conduct any VDM activities in Florida. Some people who oppose any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild birds would not be affected by WS's activities under this alternative. However, other entities would likely conduct similar VDM activities as those that would no longer be conducted by WS. The effects would then be similar to the proposed action alternative.

4.1.4.2 Effects on Aesthetic Values of Property Damaged by Birds

Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

As discussed in Chapter 1 and 2, vultures can cause aesthetic damage to property. An Integrated VDM strategy, a combination of lethal and nonlethal means, has the greatest potential of successfully reducing this type of damage. All VDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage for people who would have no relief from such damage if nonlethal methods were ineffective or impractical. An example would be in a situation such as those involving urban vulture populations, the implementation of nonlethal controls such as harassment methods could actually increase the risk of problems at other sites by causing the birds to move to other urban roosting sites not previously affected. In such cases, lethal removal of the birds may actually be the best alternative from the standpoint of overall concerns in the local area. By having the option of using lethal control methods where nonlethal methods would likely not be successful, the conflict is reduced not only at the vulture damage site but also in the surrounding area. If WS is providing direct operational assistance in relocating vultures, coordination with local authorities to monitor the birds' movements is generally conducted to assure they do not reestablish in undesirable locations.

Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, WS would be restricted to implementing and recommending only nonlethal methods in providing assistance with vulture damage problems and conflicts. The success or failure of the use of nonlethal methods can be quite variable. If nonlethal VDM methods are not effective WS would not be able to recommend or use any lethal VDM method. Individuals would either take no action which means problems would likely continue or increase in each situation as

bird numbers are maintained or increased, or implement their own lethal VDM program. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective VDM program.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of problems at other sites by causing the birds to move to sites not previously affected. In such cases, vulture damage may remain the same or actually become worse. Some requesting entities would reject WS assistance for this reason and would likely seek to achieve vulture control by other means. However, if WS is providing direct operational assistance in relocating vultures, coordination with local authorities may be conducted to assure they do not re-establish in undesirable locations.

Alternative 3 - Technical Assistance Only

Under this alternative, WS would not engage in direct operational use of any VDM methods. Only technical advice would be recommended to alleviate vulture damage and conflicts in all situations. Potential impacts would be variable. With WS technical assistance but no direct management, entities requesting VDM would either take no action which means the risk of problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement WS recommendations for nonlethal and lethal control methods. Individuals or entities that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective VDM program.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of problems at other sites by causing the birds to move to sites not previously affected. This potential risk would be less likely under this alternative than Alternative 5 when people requesting assistance receive and accept WS technical assistance recommendations.

Alternative 4 - Lethal VDM Only by WS

Under this alternative, WS would be restricted to implementing and recommending only lethal methods in providing assistance with vulture damage problems and conflicts. Potential impacts would be variable. At times lethal methods may not be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms. In these situations WS would not be able to recommend or use nonlethal methods that otherwise would be available under the proposed action. When lethal VDM can not be used or recommended by WS at a site-specific location, entities requesting VDM would either take no action which means problems would likely continue or increase in each situation as bird numbers are maintained or increased, or implement their own nonlethal VDM program. Individuals or entities that implement nonlethal management actions may or may not have the experience necessary to efficiently and effectively conduct an effective VDM program.

In some situations the implementation of nonlethal controls such as harassment could actually increase problems at other sites by causing the birds to move to sites not previously affected. This potential risk under this alternative would be similar to Alternative 5.

Alternative 5 - No Federal WS VDM

Potential impacts would be variable. With no WS assistance, resource owners and land managers would be responsible for developing and implementing their own VDM program. Efforts by these individuals to reduce or prevent conflicts could result in less experienced persons implementing control methods, therefore leading to a greater potential of not reducing vulture problems, than under the proposed action.

In some situations the implementation of nonlethal controls such as harassment could actually increase the risk of problems at other sites by causing the birds to move to sites not previously affected. Under this alternative, vulture damage and conflicts could increase if individuals were unable to find and implement effective means of controlling vultures that cause damage problems.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used by WS

4.1.5.1 Alternative 1 - IWDM VDM Program (Proposed Action/No Action)

Under this alternative, methods viewed by some persons as inhumane would be used in VDM by WS. These methods would include harassment techniques, shooting, and live trapping followed by euthanasia. WS biologists and specialists are professionals and are concerned about animal welfare. They use their knowledge and experience to select and use the most humane methods practical to achieve program goals.

Shooting, when performed by experienced professionals, usually results in a quick death for target birds. Occasionally, however, some birds are initially wounded and must be shot a second time or must be caught by hand and then dispatched or euthanized. Some persons would view shooting as inhumane. Some people would view methods used to trap vultures as inhumane. WS uses the most humane animal traps available to effectively capture animals targeted for removal. Occasionally, birds captured alive by panel or modified padded-jaw foot hold traps, or by hand or with nets would be euthanized. The most common methods of euthanization would be by cervical dislocation and CO₂ gas which are AVMA-approved euthanasia method (Beaver et al. 2001). Most people would view AVMA-approved euthanization methods as humane.

4.1.5.2 Alternative 2 - Nonlethal VDM Only by WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. Nonlethal methods that some people may view as inhumane would be used by WS. These methods would include harassment techniques. Humanness of nonlethal methods used by WS under this alternative would be similar to the proposed action. Overall, people who perceive the use of lethal management methods by WS as inhumane would prefer this alternative to the proposed action. Although WS would not perform any lethal activities under this alternative, other entities would likely conduct VDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.5.3 Alternative 3 - Technical Assistance Only

Under this alternative, WS would not conduct any operational lethal or nonlethal VDM, but would only provide technical advice. People who perceive the use of VDM methods by WS as inhumane would prefer this alternative to the proposed action. Lethal and nonlethal methods viewed as inhumane by some persons would not be used by WS. Resource owners and property managers could use the information provided by WS or implement their own VDM program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by resource owners and land managers. Overall impacts should be less than Alternative 5 when WS technical advice is requested and followed.

4.1.5.4 Alternative 4 - Lethal VDM Only by WS

Under this alternative, nonlethal methods that some people may view as inhumane would not be used by WS, but could be still used by affected resource owners and land managers. Lethal methods that some people may view as inhumane would be used by WS. These methods would include shooting and live trapping followed by euthanasia. Overall, persons who view killing of any kind as inhumane would strongly oppose this alternative. Humanness of lethal VDM methods used by WS under this alternative would be similar to the proposed action alternative.

4.1.5.5 Alternative 5 - No Federal WS VDM

Under this alternative, VDM methods viewed as inhumane by some persons would not be used or recommended by WS. Although WS would not perform any VDM activities under this alternative, other entities would likely conduct VDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.2 Cumulative Impacts

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time. No significant cumulative environmental impacts are expected from any of the 5 alternatives. Table 4-6 summarizes the expected impacts of each of the alternatives on each of the issues.

The Virginia and Florida WS Programs remove the largest number of vultures in the Eastern WS Program (Table 4-2 and Table 4-3). Florida WS removes more migratory turkey vultures than black vultures; Virginia WS removes more black vultures than turkey vultures. The focus of vulture control by Florida WS is human health and safety and property damage; conversely, control efforts by Virginia WS focuses on property damage and livestock predation. Under the Proposed Action and Alternative 4, the lethal removal of vultures would not have a significant impact on overall vulture populations in Florida or the United States, but some local reductions may occur. Local reductions that may occur would be temporary.

VDM methods used or recommended by the WS program in Florida will likely have no cumulative adverse effects on non-target wildlife populations. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent. There is a slight increased risk to non-target species when VDM activities are conducted by persons that reject WS assistance and recommendations in Alternatives 1, 2, 3, and 4, and when no WS assistance is provided in Alternative 5. In all 5 Alternatives, however, it would not be to the point that the impacts would be significant.

No risk to public safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1, 2, 3 and 4, since only trained and experienced wildlife biologists/specialists would conduct and recommend VDM activities. There is a slight increased risk to public safety when VDM activities are conducted by persons that reject WS assistance and recommendations in Alternatives 1, 2, 3, and 4, and when no WS assistance is provided in Alternative 5. In all 5 Alternatives, however, it would not be to the point that the impacts would be significant.

Although some persons will likely be opposed to WS's participation in VDM activities to protect property, livestock, pets, human health and safety, and agricultural resources from vulture damage, the analysis in this EA indicates that WS Integrated VDM program will not result in significant cumulative adverse impacts on the quality of the human environment.

Table 4-6. Relative Comparison of Anticipated Impacts From Alternatives.

Issues/Impacts	Alt. 1 IWDM VDM (Proposed Action/No Action)	Alt. 2 Nonlethal VDM Only by WS	Alt. 3 Technical Assistance Only	Alt. 4 Lethal VDM Only by WS	Alt. 5 No Federal WS VDM Program
Effects on Target Species	Low effect - reductions in local vulture numbers; would not adversely affect state, regional and continental populations	No effect by WS. Low effect - reductions in local vulture numbers by non-WS personnel likely; would not adversely affect state, regional and continental populations.	No effect by WS. Low effect - reductions in local vulture numbers by non-WS personnel likely; would not adversely affect state, regional and continental populations.	Low effect - reductions in local vulture numbers; would not adversely affect state, regional and continental populations	No effect by WS. Low effect - reductions in local vulture numbers by non-WS personnel likely; would not adversely affect state, regional and continental populations
Effects on Non- target Species	Low effect - methods used by WS would be highly selective with very little risk to nontarget species	Low effect - methods used by WS would be highly selective with very little risk to non-target species. Impacts by non-WS personnel would be variable	No effect by WS. Impacts by non- WS personnel would be variable.	Low effect - methods used by WS would be highly selective with very little risk to non-target species. Impacts by non-WS personnel would be variable	No effect by WS. Impacts by non- WS personnel would be variable.

Issues/Impacts	Alt. 1 IWDM VDM (Proposed Action/No Action)	Alt. 2 Nonlethal VDM Only by WS	Alt. 3 Technical Assistance Only	Alt. 4 Lethal VDM Only by WS	Alt. 5 No Federal WS VDM Program
Effects on Human Health and Safety - Risks of Adverse Effects from VDM Methods	Low risk - methods used by WS would be safe with no probable risk of human health or safety effects.	Low risk - methods used by WS would be safe with no probable risk of human health or safety effects. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non- WS personnel would be variable.	Low risk - methods used by WS would be safe with no probable risk of human health or safety effects. Impacts by non-WS personnel would be variable.	No effect by WS. Impacts by non- WS personnel would be variable.
Aesthetic Enjoyment of Birds	Low to moderate effect at local levels; Some local populations may be reduced; WS vulture damage management activities do not adversely affect overall state, regional and continental vulture populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase when nonlethal methods are ineffective unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental vulture populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental vulture populations.	Low to moderate effect at local levels; Some local populations may be reduced; WS vulture damage management activities do not adversely affect overall state, regional and continental vulture populations.	Low to moderate effect. Local bird numbers in damage situations would remain high or possibly increase unless non-WS personnel successfully implement lethal methods; no adverse affect on overall state, regional and continental vulture populations.

Issues/Impacts	Alt. 1 IWDM VDM (Proposed Action/No Action)	Alt. 2 Nonlethal VDM Only by WS	Alt. 3 Technical Assistance Only	Alt. 4 Lethal VDM Only by WS	Alt. 5 No Federal WS VDM Program
Aesthetic Damage by Vultures	Low impact - This alternative will reduce this risk. Vulture damage problems most likely to be resolved without creating or moving problems elsewhere.	Low to Moderate impact - vultures may move to other sites which can create aesthetic damage problems at new sites. Less likely than Alternatives 3, 4 and 5.	Moderate to High effect - vultures may move to other sites which can create aesthetic damage problems at new sites.	Moderate to High effect - vultures may move to other sites when non- WS personnel implement nonlethal methods which can create aesthetic damage problems at new sites.	High effect - vulture problems less likely to be resolved without WS involvement. Birds may move to other sites which can create aesthetic damage problems at new sites.
Humaneness and Animal Welfare Concerns of VDM Methods Used by WS	Low to Moderate impact - methods viewed by some people as inhumane would be used by WS.	Lower impact than Alternative 1 since only nonlethal methods would be used by WS. Impacts by non-WS personnel would be variable	No effect by WS. Impacts by non- WS personnel would be variable.	Low to Moderate impact - methods viewed by some people as inhumane would be used by WS.	No effect by WS. Impacts by non- WS personnel would be variable

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APPENDIX A

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APPENDIX B

VULTURE DAMAGE MANAGEMENT (VDM) METHODS AVAILABLE FOR USE OR RECOMMENDATION BY THE FLORIDA WILDLIFE SERVICES PROGRAM

Livestock producer and property owner practices. These consist primarily of nonlethal preventive methods such as cultural methods and habitat modification. Cultural methods and habitat modifications are implemented by the livestock producer or property owners/managers. Resource owners/managers and property owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include:

Cultural methods. Cultural methods generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices include but are not limited to techniques such removal of carcasses, indoor birthing of livestock, and closed barns or corrals (Lowney 1999, Johnson and Glahn 1994).

Environmental/Habitat modification can be an integral part of VDM. Wildlife production and/or presence is directly related to the type, quality, and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain bird species or to repel certain birds. In most cases, the resource or property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that have the best chance of achieving the desired effect. Habitat management is most often a primary component of VDM strategies at or near airports to reduce bird aircraft strike problems by eliminating bird nesting, roosting, loafing, or feeding sites. Generally, many bird problems on airport properties can be minimized through management of food sources, vegetation and water from areas adjacent to aircraft runways (Godin 1994). Habitat management is often necessary to minimize damage caused by vultures that form large roosts during late autumn and winter. Bird activity can be greatly reduced at roost sites by removing all the trees or selectively thinning the stand. Roosts often will re-form at traditional sites, and substantial habitat alteration is sometimes the only way to permanently stop such activity at a site (USDA 1997).

Animal behavior modification. This refers to tactics that alter the behavior of wildlife to reduce damage. Animal behavior modification may involve use of scare tactics or fencing to deter or repel animals that cause loss or damage (Twedt and Glahn 1982). Some but not all methods that are included by this category are:

- Bird-proof barriers
- Electronic guards
- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Repellents
- Scare crows
- Mylar tape
- Eye-spot balloons
- Lasers
- Effigies (taxidermic mounts, carcasses, and modified plastic goose decoys)
- Shooting to harass

These techniques are generally only practical for small areas. Scaring devices such as distress calls, helium filled eye spot balloons, raptor effigies and silhouettes, mirrors, and moving disks can be effective but usually for only a short time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990,

Roszbach 1975, Graves and Andelt 1987, Mott 1985, Shirota and Masake 1983, Conover 1982, Arhart 1972). Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, Tobin et al. 1988).

Bird proof barriers can be effective but are often cost-prohibitive, particularly because of the aerial mobility of birds which requires overhead barriers as well as peripheral fencing or netting. Exclusion adequate to stop bird movements can also restrict movements of livestock, people and other wildlife (Fuller-Perrine and Tobin 1993). Heavy plastic strips hung vertically in open doorways have been successful in some situations in excluding birds from buildings used for indoor feeding or housing of livestock (Johnson and Glahn 1994).

Overhead wires can effectively deter bird use of specific areas where they are causing a nuisance (Gorenzel et al 1994). The birds apparently fear colliding with the wires and thus avoid flying into areas where the method has been employed. Overhead wires may be used to prevent vultures from loafing on the peaks of steep-roofed homes.

Porcupine wire (e.g., Nixalite™, Catclaw™) is a mechanical repellent method that can be used to exclude birds from ledges and other roosting surfaces (Williams and Corrigan 1994). The sharp points inflict temporary discomfort on the birds as they try to land which deters them from roosting. Drawbacks of this method that it can be expensive to implement if large areas are involved. Coil wire, which resembles a slinky toy, can be used on ledges as a mechanical repellent. Electric shock bird control systems are available from commercial sources and, although expensive, can be effective in deterring birds from roosting on ledges, window sills and other similar portions of structures (Williams and Corrigan 1994). Electrical shock bird control systems similar to those placed on window ledges can be placed on the peaks of roofs of homes to deter vultures from loafing (Bird Barrier America 1999).

Auditory scaring devices such as propane exploders, pyrotechnics, electronic guards, scare crows, shooting in the air, and audio distress/predator vocalizations are effective in many situations for dispersing damage-causing bird species. These devices are sometimes effective but usually only for a short period of time before birds become accustomed and learn to ignore them (Schmidt and Johnson 1984, Bomford 1990, Booth 1994, Roszbach 1975, Mott 1985, Shirota and Masake 1983, and Arhart 1972). Birds, too, quickly learn to ignore scaring devices if the birds' fear of the methods is not reinforced with other tactics.

Visual scaring techniques such as use of mylar tape (highly reflective surface produces flashes of light that startles birds), eye-spot balloons (the large eyes supposedly give birds a visual cue that a large predator is present), flags, effigies, sometimes are effective in reducing bird damage. Mylar tape has produced mixed results in its effectiveness to frighten birds (Dolbeer et al. 1986, and Tobin et al. 1988). Birds quickly learn to ignore visual and other scaring devices if the birds' fear of the methods is not reinforced with other tactics.

Effigies can be used to disperse vulture roosts and protect property (Avery et al. 2002, Tillman et al. 2002). Effigies can be dead vultures, taxidermy vultures, or modified plastic goose decoys painted to resemble vultures (Humphrey et al. 2001, Avery et al. 2002, Tillman et al. 2002). Effigies are hung upside down as high as possible in roost trees or from specially constructed masts to disperse vultures (Humphrey et al. 2001, Tillman et al. 2002). A migratory bird permit is required from the FWS before a vulture may be taken to use as an effigy or to salvage a dead vulture (e.g., road kill) to use as an effigy.

Lasers are non-chemical, nonlethal technique recently evaluated by the National Wildlife Research Center to disperse double-crested cormorant roosts (Glahn et al. 2000). For best results and to disperse numerous birds from a roost, the laser is most effectively used in periods of low light, such as after sunset and before sunrise. In the daytime, the laser can also be used during overcast conditions or in shaded areas to move individuals and small numbers of birds, although the effective range of the laser is much diminished. Moving the laser light through the tree branches rather than touching birds with the laser light elicited an avoidance response from cormorants (Glahn et al. 2000). During pen trials with lasers, the cormorants were inconsistent in their response with some birds showing no response to the laser (Glahn et al. 2000). The lack of overt response by cormorants to lasers is not clearly understood, but suggests laser light is not an highly aversive agent (Glahn et al. 2000). Blackwell et al. (2002) tested lasers on several bird species and observed varied results among species. Lasers were ineffective at dispersing starlings and cowbirds (Blackwell et al. (2002)). Lasers were initially effective at dispersing pigeons and mallard ducks but the birds habituated in approximately 5-minutes and 20-minutes, respectively (Blackwell et al. (2002)). Canada geese reacted to the laser displaying neophobic avoidance to the approaching laser beam.

Vulture response to lasers is currently being evaluated. In Florida, a roost of over 250 vultures in a residential neighborhood was dispersed after a laser was used there during 4 consecutive evenings. No habituation to the laser was noted. However, the birds returned 2 days later after laser harassment had ceased (M. Avery, NWRC, pers. commun.). At three other roosts, similar short-term responses were observed. In Florida, lasers have been used with other nonlethal and lethal methods as part of an integrated roost dispersal program. While the laser did disperse the vultures initially, some vultures habituated to the laser and eventually stopped responding (C. Fox and D. Blixt, WS, pers. commun.). It appears that lasers can provide some short-term vulture control, but their long-term effectiveness remains to be determined. As with other tools, lasers are best viewed as components of an integrated management effort.

Live traps include:

Live/Decoy traps are used by WS for preventive and corrective damage management. Decoy traps are similar in design to the Australian Crow Trap as reported by Johnson and Glahn (1994) and McCracken (1972). Live traps are designed as a large rectangular pen with an open funnel placed at one end where vultures enter the trap. Carrion or other food (fish parts) is placed within the trap or just outside the funnel entrance. After the first few vultures are captured they act as decoy birds. Perches are configured in the trap to allow birds to roost above the ground and in a more natural position. Feeding behavior and calls of the decoy birds attract other birds which enter and become trapped themselves. Active traps are monitored daily, every other day, or as appropriate, to remove and euthanize or release trapped birds and to replenish bait and water. Decoy traps and other cage/live traps pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Modified foothold traps are used in urban/suburban areas where vultures are damaging buildings and other structures. The traps have padded jaws and weaker springs than similar sized number 3 traps. The traps are usually set in gravel or rock ballast on roofs around a large meat bait or carcass anchored to the roof of the building being used by the vultures. The traps are anchored to railroad tie plates or other heavy objects. Captured vultures are humanely euthanized.

Rocket or cannon nets are projectile-type net traps comprised of 3 - 5 rockets or cannons and a large net (e.g., 33 x 57 foot with 2-inch square nylon mesh) (Dill and Thornberry 1950, Cox and Afton 1994, Eriksen et al. undated). The net is folded upon itself or set inside a net box (Eriksen et al. undated). The rear of the net is anchored to 5 or 10 pound boat anchors or tied with inner tubes to stakes driven into the ground. Bait is placed approximately 15 feet in front of the net. The rockets or projectiles in the cannons are propelled by a smokeless powder charge or black powder charge which is ignited with an electric squib inside the charge. The charges are placed inside the rockets or cannon tubes and tested with a galvanometer for electrical continuity. A spool of at least 200 - 350 feet of 18 or larger gauge wire is unspooled and connected at one end to the charges and at the other end to a blasting machine. When an adequate number of birds are in front of the net, usually less than 25 feet away, the blasting machine is charged and fired. Firing the blasting machine sends an electrical charge down the wire and ignites the charges in the rockets or cannon tubes which then discharges the net from the folded position. Birds are caught alive with rare instance of a bird being killed or injured. Captured vultures may be humanely euthanized or released.

Tactile repellents. A number of tactile repellent products are on the market which reportedly deters birds from roosting on certain structural surfaces by presenting a tacky or sticky surface that the birds avoid. However, experimental data in support of this claim are sparse (Mason and Clark 1992). The repellency of tactile products is generally short-lived because of dust, and they sometimes cause aesthetic problems and expensive clean-up costs by running down the sides of buildings in hot weather.

Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large number of birds are present. Normally shooting is conducted with shotguns or rifles. It may also be conducted with .22 or .25 caliber air rifles. Birds are killed as quickly and humanely as possible. Shooting is a very individual specific method and is normally used to remove a single offending bird. However, at times, a few birds could be shot from a

flock to make the remainder of the birds more wary and to help reinforce nonlethal methods. Removal of a few vultures from a local population increases the efficacy of harassment programs and prevents habituation to harassment (Kadlec 1968). Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997a). All firearm safety precautions are followed by WS when conducting VDM activities and all laws and regulations governing the lawful use of firearms are strictly complied with.

Firearm use is very sensitive and a public concern because of safety issues relating to the public and misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Cervical dislocation is sometimes used to euthanize birds which are captured in live traps. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and other small birds (Beaver et al. 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (Beaver et al. 2001).

CO₂ is sometimes used to euthanize birds which are captured in live traps. Live birds are placed in a container such as a plastic 5-gallon bucket or chamber and sealed shut. CO₂ gas is released into the bucket or chamber and birds quickly die after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (Beaver et al. 2001). CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is used to carbonate beverages for human consumption and is also the gas released by dry ice. The use of CO₂ by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

APPENDIX C

Federal Listed Threatened and Endangered Species in Florida.

. Florida -- 111 listings

Animals -- 57

<u>Status</u>	<u>Listing</u>
T(S/A)	Alligator, American (<i>Alligator mississippiensis</i>)
T	Bankclimber, purple (mussel) (<i>Elliptioideus sloatianus</i>)
E	Bat, gray (<i>Myotis grisescens</i>)
E	Butterfly, Schaus swallowtail (<i>Heracles aristodemus ponceanus</i>)
T	Caracara, Audubon's crested (FL pop.) (<i>Polyborus plancus auduboni</i>)
XN	Crane, whooping U.S.A. (CO, ID, FL, NM, UT, and the western half of Wyoming) (<i>Grus americana</i>)
E	Crocodile, American (<i>Crocodylus acutus</i>)
E	Darter, Okaloosa (<i>Etheostoma okaloosae</i>)
E	Deer, key (<i>Odocoileus virginianus clavium</i>)
T	Eagle, bald (lower 48 States) (<i>Haliaeetus leucocephalus</i>)
T	Jay, Florida scrub (<i>Aphelocoma coerulescens</i>)
E	Kite, Everglade snail (FL pop.) (<i>Rostrhamus sociabilis plumbeus</i>)
E	Manatee, West Indian (<i>Trichechus manatus</i>)
E	Moccasinshell, Gulf (<i>Medionidus penicillatus</i>)
E	Moccasinshell, Ochlockonee (<i>Medionidus simpsonianus</i>)
E	Mouse, Anastasia Island beach (<i>Peromyscus polionotus phasma</i>)
E	Mouse, Choctawhatchee beach (<i>Peromyscus polionotus allophrys</i>)
E	Mouse, Key Largo cotton (<i>Peromyscus gossypinus allapaticola</i>)
E	Mouse, Perdido Key beach (<i>Peromyscus polionotus trissyllepsis</i>)
T	Mouse, southeastern beach (<i>Peromyscus polionotus niveiventris</i>)
E	Mouse, St. Andrew beach (<i>Peromyscus polionotus peninsularis</i>)
E	Panther, Florida (<i>Puma (=Felis) concolor coryi</i>)
E	Pigtoe, oval (<i>Pleurobema pyriforme</i>)
T	Plover, piping (except Great Lakes watershed) (<i>Charadrius melodus</i>)
E	Pocketbook, shinyrayed (<i>Lampsilis subangulata</i>)
T(S/A)	Puma (=mountain lion) (FL) (<i>Puma (=Felis) concolor (all subsp. except coryi)</i>)
E	Rabbit, Lower Keys marsh (<i>Sylvilagus palustris hefneri</i>)
E	Rice rat (lower FL Keys) (<i>Oryzomys palustris natator</i>)
T	Salamander, flatwoods (<i>Ambystoma cinquantum</i>)
E	Sea turtle, green (FL, Mexico nesting pops.) (<i>Chelonia mydas</i>)
T	Sea turtle, green (except where endangered) (<i>Chelonia mydas</i>)
E	Sea turtle, hawksbill (<i>Eretmochelys imbricata</i>)
E	Sea turtle, Kemp's ridley (<i>Lepidochelys kempi</i>)
E	Sea turtle, leatherback (<i>Dermochelys coriacea</i>)
T	Sea turtle, loggerhead (<i>Caretta caretta</i>)
E	Seal, Caribbean monk (<i>Monachus tropicalis</i>)
T	Shrimp, Squirrel Chimney Cave (<i>Palaemonetes cummingsi</i>)
T	Skink, bluetail mole (<i>Eumeces egregius lividus</i>)
T	Skink, sand (<i>Neoseps reynoldsi</i>)
T	Slabshell, Chipola (<i>Elliptio chipolaensis</i>)
T	Snail, Stock Island tree (<i>Orthalicus reses (not incl. nesodryas)</i>)
T	Snake, Atlantic salt marsh (<i>Nerodia clarkii taeniata</i>)
T	Snake, eastern indigo (<i>Drymarchon corais couperi</i>)
E	Sparrow, Cape Sable seaside (<i>Ammodramus maritimus mirabilis</i>)
E	Sparrow, Florida grasshopper (<i>Ammodramus savannarum floridanus</i>)
E	Stork, wood (AL, FL, GA, SC) (<i>Mycteria americana</i>)
T	Sturgeon, gulf (<i>Acipenser oxyrinchus desotoi</i>)
E	Sturgeon, shortnose (<i>Acipenser brevirostrum</i>)
T	Tern, roseate (Western Hemisphere except NE U.S.) (<i>Sterna dougallii dougallii</i>)
E	Three-ridge, fat (mussel) (<i>Ambelma neisleri</i>)
E	Vole, Florida salt marsh (<i>Microtus pennsylvanicus dukecampbelli</i>)
E	Whale, finback (<i>Balaenoptera physalus</i>)
E	Whale, humpback (<i>Megaptera novaeangliae</i>)
E	Whale, right (<i>Balaena glacialis (incl. australis)</i>)
E	Wolf, red (except where XN) (<i>Canis rufus</i>)

- E Woodpecker, red-cockaded (*Picoides borealis*)
 E Woodrat, Key Largo (*Neotoma floridana smalli*)

Plants -- 54

Status Listing

- E Lead-plant, Crenulate (*Amorpha crenulata*)
 E Pawpaw, four-petal (*Asimina tetramera*)
 T Bonamia, Florida (*Bonamia grandiflora*)
 E Bellflower, Brooksville (*Campanula robbinsiae*)
 E Prickly-apple, fragrant (*Cereus eriophorus* var. *fragrans*)
 E Spurge, deltoid (*Chamaesyce deltoidea* ssp. *deltoidea*)
 T Spurge, Garber's (*Chamaesyce garberi*)
 E Fringe-tree, pygmy (*Chionanthus pygmaeus*)
 E Aster, Florida golden (*Chrysopsis floridana*)
 E Cladonia, Florida perforate (*Cladonia perforata*)
 T Pigeon wings (*Clitoria fragrans*)
 E Rosemary, short-leaved (*Conradina brevifolia*)
 E Rosemary, Etonia (*Conradina etonia*)
 E Rosemary, Apalachicola (*Conradina glabra*)
 E Harebells, Avon Park (*Crotalaria avonensis*)
 E Gourd, Okeechobee (*Cucurbita okeechobeensis* ssp. *okeechobeensis*)
 E Pawpaw, beautiful (*Deeringothamnus pulchellus*)
 E Pawpaw, Rugel's (*Deeringothamnus rugelii*)
 E Mint, Garrett's (*Dicerandra christmanii*)
 E Mint, longspurred (*Dicerandra comutissima*)
 E Mint, scrub (*Dicerandra frutescens*)
 E Mint, Lakela's (*Dicerandra immaculata*)
 T Buckwheat, scrub (*Eriogonum longifolium* var. *gnaphalifolium*)
 E Snakeroot (*Eryngium cuneifolium*)
 T Spurge, telephus (*Euphorbia telephioides*)
 E Milkpea, Small's (*Galactia smallii*)
 T Seagrass, Johnson's (*Halophila johnsonii*)
 E Beauty, Harper's (*Harperocallis flava*)
 E Hypericum, highlands scrub (*Hypericum cumulicola*)
 E Jacquemontia, beach (*Jacquemontia reclinata*)
 E Water-willow, Cooley's (*Justicia cooleyi*)
 E Blazingstar, scrub (*Liatris ohlingerae*)
 E Lupine, scrub (*Lupinus aridorum*)
 T Birds-in-a-nest, white (*Macbridea alba*)
 E Beargrass, Britton's (*Nolina brittoniana*)
 T Whitlow-wort, papery (*Paronychia chartacea*)
 E Cactus, Key tree (*Pilosocereus robinii*)
 T Butterwort, Godfrey's (*Pinguicula ionantha*)
 E Polygala, Lewton's (*Polygala lewtonii*)
 E Polygala, tiny (*Polygala smallii*)
 E Wireweed (*Polygonella basiramia*)
 E Sandlace (*Polygonella myriophylla*)
 E Plum, scrub (*Prunus geniculata*)
 E Rhododendron, Chapman (*Rhododendron chapmanii*)
 T Gooseberry, Miccosukee (*Ribes echinellum*)
 E Chaffseed, American (*Schwalbea americana*)
 T Skullcap, Florida (*Scutellaria floridana*)
 E Campion, fringed (*Silene polypetala*)
 E Pinkroot, gentian (*Spigelia gentianoides*)
 E Meadowrue, Cooley's (*Thalictrum cooleyi*)
 E Torreya, Florida (*Torreya taxifolia*)
 E Warea, wide-leaf (*Warea amplexifolia*)
 E Mustard, Carter's (*Warea carteri*)
 E Ziziphus, Florida (*Ziziphus celata*)

APPENDIX D.

State of Florida Listed Species

Fish

Shortnose sturgeon (*Acipenser brevirostrum*)
Blackmouth shiner (*Notropis melanostomus*)
Key silverside (*Menidia conchorum*)
Crystal darter (*Crystallaria asprella*)
Okaloosa darter (*Etheostoma olalossae*)

Reptiles

American crocodile (*Crocodylus acutus*)
Key ringneck snake (*Diadophis punctatus acricus*)
Eastern indigo snake (*Drymarchon corais couperi*)
Atlantic salt marsh water snake (*Nerodia clarkii taeniata*)
Short-tailed snake (*Stilosoma extenuatum*)
Florida brown snake (*Storeria dekayi victa*)
Rim rock crowned snake (*Tantilla oolitica*)
Florida ribbon snake (*Thamnophis sauritus sackeni*)
Bluetail mole skink (*Eumeces egregious lividus*)
Sand skink (*Neoseps reynoldsi*)
Striped mud turtle (*Kinosternon baurii*)
Loggerhead sea turtle (*Caretta caretta*)
Green sea turtle (*Chelonia mydas*)
Hawksbill sea turtle (*Eretmochelys imbricata*)
Kemp's ridley sea turtle (*Lepidochelys kempii*)

Birds

Piping plover (*Charadrius melodus*)
Snowy plover (*Charadrius alexandrinus*)
Least tern (*Sterna antillarum*)
Roseate tern (*Sterna dougalli*)
Florida sandhill crane (*Grus canadensis pratensis*)
Wood stork (*Mycteria americana*)
Crested caracara (*Caracara cheriway*)
Peregrine falcon (*Falco peregrinus*)
Southeastern American kestrel (*Falco sparverius paulus*)
Bald eagle (*Haliaeetus leucocephalus*)
Everglades snail kite (*Rostrhamus sociabilis plumbeus*)
Florida scrub jay (*Aphelocoma coerulescens*)
Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*)
Florida grasshopper sparrow (*Ammodramus savannarum floridanus*)
White-crowned pigeon (*Columba leucocephala*)
Kirtland's warbler (*Dendroica kirtlandii*)
Bachman's warbler (*Vermivora bachmanii*)
Ivory-billed woodpecker (*Campephilus principalis*)

Mammals

Florida panther (*Puma concolor coryi*)
Florida black bear (*Ursus americanus floridanus*)
Everglades mink (*Mustela vison evergladensis*)
Key deer (*Odocoileus virginianus clavium*)
Lower Keys marsh rabbit (*Sylvilagus palustris hefneri*)
Big Cypress fox squirrel (*Sciurus niger avicennia*)
Silver rice rat (*Oryzomys argentatus*)
Key Largo wood rat (*Neotoma floridana smalli*)
Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*)
Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*)
Southeastern beach mouse (*Peromyscus polionotus niveiventris*)
Anastasia Island beach mouse (*Peromyscus polionotus phasma*)
St. Andrews beach mouse (*Peromyscus polionotus peninsularis*)
Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*)
Florida mastiff bat (*Eumops glaucinus floridanus*)
Gray bat (*Myotis grisescens*)
Indiana bat (*Myotis sodalis*)
Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*)
Sei whale (*Balaenoptera borealis*)
Fin whale (*Balaenoptera physalus*)
Right whale (*Eubalaena glacialis*)
Humpback whale (*Megaptera novaeangliae*)
Sperm whale (*Physeter macrocephalus*)
Florida manatee (*Trichchus manatus latirostris*)

Corals

Pillar coral (*Dendrogyra cylindrus*)

Insects

Miami blue butterfly (*Cyclargus thomasi bethunebakeri*)
Schaus' swallowtail butterfly (*Heraclides aristodemus ponceanus*)

Mollusks

Stock Island tree snail (*Orthalicus reses*)